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AN INQUIRY INTO THE CAUSE OF OLIGOHYDRAMNIOS*

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CLINICALLY, oligohydramnios is regarded as of little importance since it occurs relatively seldom. From the theoretic standpoint, completely studied cases of oligohydramnios are highly intriguing, since, with the question of their origin, other questions of prime importance are bound up, whose clinical elucidation is difficult and experimental elaboration well-nigh impossible; namely, the problem of the origin of the amniotic fluid, and the question regarding the mechanism of certain malformations, especially of the uropoietic system. Thus viewed, each case of oligohydramnios appears like an experiment of Nature which comes to our aid in a condition which we are not able to produce artificially, an experiment that is of complete value only when we possess exact findings of the mother, fetus, and placenta. Of the cases reported in the literature very few include a description of all three.

At the Second Gynecologic Clinic, in Vienna, there occurred recently a case which presented the opportunity for exact examination of the mother, fetus, and placenta; all three of which presented noteworthy findings.

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CASE RECORD.—M. J., forty years of age, married. Admitted 4/11/26; discharged 4/24/26.

Anomalies: uterine inertia, premature fetus, club feet, oligohydramnios.

Previous history: tinnitus aurium since 1922. In 1910, after her first delivery, ovariectomy was performed for cyst; gravida vi. Menses began at age of thirteen, every twenty-eight days; lasted three days, slight cramps. Last menstruation 8/5/25.

On admission: Temperature, 37.9° C.; pulse, 80. Slight varicosity of lower extremities; no edema. No sugar or albumin. Wassermann negative.

Vaginal examination: Cervix thickened, dilated to size of half dollar, vertex presentation, L. O. A., not fully engaged, membranes not ruptured. Pains very weak. After injection of pituitrin spontaneous delivery in thirty minutes was followed by a very small amount of amniotic fluid—about two tablespoonfuls. Placenta was delivered fifteen minutes later. Labor lasted fourteen hours. Temp., 36.6° C. The baby was a female, 43 cm. long, and weighed 2,000 grams; it had club feet. It lived thirteen hours.

Placenta: noticeably small, weight 370 grams, circular in shape, 140 mm. in diameter. Cord was eccentrically inserted, 3 cm. from the placental edge, but was not abnormally twisted. In several places it was flattened (Meyer-Ruegg), and here, on cross section, the vessels were arranged like a triangle instead of being aligned. The fetal membranes were of normal thickness and consistency. No abnormal denseness or toughness (Goldner, Jaggard) was observed either at delivery or in the prepared specimen. The amnion was smooth, moist, and glossy and stripped easily from the chorion. The placental portion showed several small infarcts but was also smooth and glossy. Several large vessels radiated from the point of insertion of the cord.

MICROSCOPIC FINDINGS

Placenta: most striking was the large number of leucocytes filling the intervillous spaces and giving the appearance of placental villi imbedded in a mass of pus. The leucocytes, between which on higher magnification a fine network of delicate fibrin filaments were seen, were more numerous and thicker on the decidual side of the placenta (Fig. 1). They decreased toward the amniotic side, but here there was an increase of red blood cells. The decidua, so far as it is preserved with the placenta, showed a loose infiltration of leucocytes, while the trophoblastic layer and fibrin stripe of Nitabuch were sparsely infiltrated. Clumps of leucocytes were in the intervillous spaces, several penetrating villi being thickly surrounded by them. On the placental side of the Nitabuch stripe, the leucocytes throughout were thicker and more numerous than on the maternal side. Nowhere has one the impression that the pus cells had wandered over from the maternal tissue to the placental; rather it appeared as if here and there isolated leucocytes from the intervillous spaces had broken through and wandered into the decidua. In the villi themselves the pus cells preponderated at the periphery. The lumens of several of the larger villous blood vessels contained numerous red and white cells, but not even in the large vessels near the insertion of the cord did we find the characteristic picture of an inflammatory infiltration of the vessel wall which alone could give the morphologic basis for the view that the leucocytes reached the inflammatory focus through the blood vessels. The walls of the larger vessels were entirely free of inflammatory changes, likewise the connective tissue of the villous stroma surrounding the vessels. The peripheral portions directly under the epithelium were thickly filled with leucocytes which elevated the intact epithelium, but did not infiltrate the villous stroma. Where the process had gone further the epithelium was lost and the free stroma was surrounded by a thick layer of pus cells which became confluent with other pus masses. Some villi showed all three conditions: intact epithelium, pus-lifted epithelium, and pus-destroyed epithe-

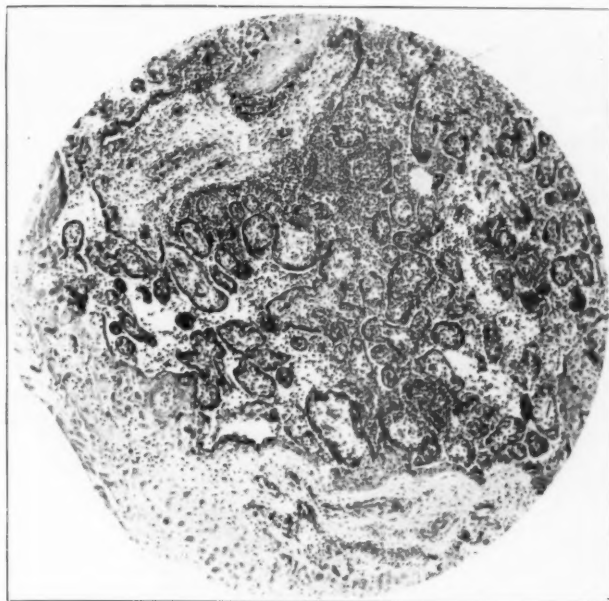


Fig. 1.—Lower left: amnion. Upper right: placental villi, below which several penetrating villi are seen. Thick masses of pus cells between the villi whose lining epithelium is in part destroyed.

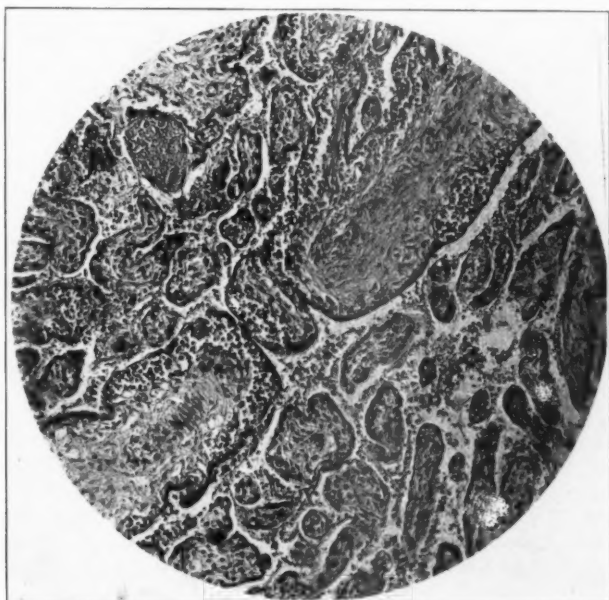


Fig. 2.—Placental villi, pus cells, and slender fibrin threads in the intervillous spaces. Upper right: epithelium of a villus lifted up by leucocytes and giving the appearance of a small vesicle. Lower left: a villus the epithelium of which has been lifted from its stroma, making a hood-like appearance.

lium (Fig. 1). Between the villi were many minute infarcts. Some surrounded ghosts of villi; some were spongy in appearance, permeated by trophoblastic cells, and showed leucocytic infiltration.

The Chorion on the free side showed pronounced edema of the subchorionic connective tissue. Abnormally large, light cystic cells were observed between which were many leucocytes. Pleomorphism of the chorionic cells was evident from the numerous strikingly large and darkly nucleated elements. The still adherent decidua showed edema, swelling, cystic degeneration and, to a slight degree, inflammatory infiltration. In the layer of chorionic cells were observed large, light, round, fibrin-like masses whose structure was shown to be loose connective tissue by Van Gieson's stain: ghosts of villi like those found normally in the early stage of the development of the chorion laeve as rests of the degenerated placental villi; in the mature placenta, occurring only exceptionally. Vorlaender lays special emphasis on this finding.



Fig. 3.—Section through the fetal membranes: the amniotic epithelium well preserved, edema in the chorioamniotic interspace, many ghosts of villi among the swollen, infiltrated chorionic trophoblasts.

The Amniotic epithelium was well preserved both on the placental and on the peripheral sides, only in a few spots of the placental amnion was it absent or degenerated. These spots showed a more or less vaulting of the connective tissue stroma combined with inflammatory infiltration. This vaulting and epithelial degeneration extended from the chorionic side toward the amnion (Fig. 4). On the placental surface were seen the typical two layers of cells: high cylindric and low cuboid with lighter protoplasm (Forsell). Adjoining, and more numerous, were areas with only one row of low cylindric or cuboid cells. Above the free edges of the high cylindric cells were masses of small and larger drops of secretion, but these were absent above the cuboid cells. On the fetal surface the amniotic epithelium was entirely normal, but showed nowhere high forms, only cuboid and flattened, which Naujoks describes as normal for the middle of pregnancy. Small defects in the amniotic epithelium without cell changes were first observed in oligohydrannios by Ahlfeld who attributed them to scratch marks by the hands or feet of the fetus. Similar defects occur

in normal placentas, in follicle cysts, and in serous cystomas, so that we cannot attribute Ahlfeld's findings to such a mechanical cause. The vacuolated structure and drops of secretion which Forsell describes as characteristic for the normal amniotic surface is nowhere observed. Histologically no ground can be found for attributing a secretory activity to the peripheral amniotic epithelium.

The Cord showed a well preserved layer of flattened amniotic cells. Wharton's jelly was relatively loose; in places the connective tissue fibers were widely separated by broad liquid-filled spaces: an edema easily explained by stasis due to twists of the cord. The muscle fibers in the blood vessels were loosely arranged. Masses of leucocytes occupied about a third of the lumina of the vessels but were not united by fibrin to form thrombi.

Autopsy of Fetus (Dr. Matras).—Anatomic findings: 43 cm. long; weight, 2,000 grams; female. General underdevelopment. Scalp edematous and hemor-

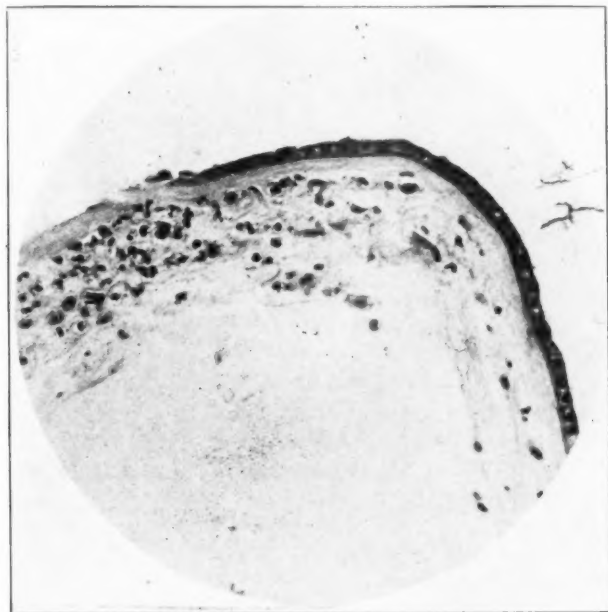


Fig. 4.—Section through the placental amnion. Right: epithelium well preserved, with normal amniotic connective tissue. Left: epithelium knocked off by inflammatory infiltration of the connective tissue.

rhagic. A large fresh clot over the entire hind brain, heavier over the right occipital lobe; blood clots in the subarachnoid space over the cerebellum, medulla, and at the base and posterior part of the cerebrum. Tentorium intact with hemorrhagic spots and streaks. Lungs not fully aerated, mottled from presence of red aerated and blue atelectatic spots. Air passages free. In both lungs subpleural punctate ecchymoses. Heart: normal size, foramen ovale and ductus Botalli wide open, membranous septum defective, muscular septum intact, vessels normal. Left kidney and ureter absent, both adrenals markedly small, left one lay deeper than normal. Right kidney compensatorily enlarged, was provided with double ureter. Tubes and ovaries normal. Stomach contained frothy mucus, small bowel empty except for some air, large bowel filled with meconium. Liver, spleen, and pancreas normal. Ureters entered the bladder on opposite sides, one crossing the spinal column to enter on the left side.

Three pathologic findings stand out in this case: (1) inflammation of the placenta, (2) oligohydramnios, and (3) maldevelopment of the uropoietic system of the fetus.

Inflammation of the placenta, aside from the chronic inflammation of lues, is a rare occurrence, particularly in cases at term or near term. The older literature has observed the occurrence of such non-specific inflammation of the placenta but did not concede its importance. Küstner, in his collected works, regards placentitis as a historic curiosity. Later, so many cases were observed that Seitz could report a whole series of them of various etiology in his chapter on Inflammation of the Placenta in Winkel's *Textbook*. More recently the reports have become rather rare so that Hinselmann, in the chapter on Inflammation of the Placenta in Seitz-Halban's *Handbuch*, reports merely the older literature.

Of the well-described cases the one by Franqué appears to be the most characteristic and important: thirty-six years old, five normal deliveries; after excision of both lips of the cervix for erosion and discharge, became pregnant a sixth time, aborted at six months under high fever. The fetus, aside from its prematurity, was underdeveloped and underweight. The placenta showed widespread purulent infection in the intervillous spaces and in the decidua. Franqué favors endarteritic processes in the placental blood vessels as the important factor. It is interesting to note that he regards the pus cells as coming from two sources: partly from the chorionic vessels, but mainly from the autochthonous, spindle cells of the villous stroma. This local and autochthonous origin of the pus cells was again put forward by Busse and has since won more adherents. In our case, one gets the impression that the leucocytes came out of the villous stroma; no ground can be found for believing that they arose from the blood vessels. The most striking difference between the case of Franqué and ours is in the distribution of the pus cells. While in Franqué's case they lay in thick masses on the chorion and amnion and, from his description, only reached out from there to the villi and intervillous spaces, in our case the inflammatory infiltration of amnion and chorion and decidua was much weaker and reached its high point in the villi and intervillous spaces. In his case too, the amniotic epithelium is entirely gone while in ours it is well preserved.

Donath's case which shows the crossing of the pus cells from the endometrium to the chorionic villi and stroma, i.e., the ascent of the inflammation from the penetrating villi, agrees exactly with ours. The seven cases of amnionitis observed by Sentex cannot be included, as microscopic findings are lacking. Urfey, like Franqué, makes note in his case of the spread of the inflammation of the decidua to the villi, together with the marked vessel changes in the latter. Seitz describes a case where the patient died in labor of eclampsia, which shows relatively mild small cell infiltration under the serosa with continuous increase towards the decidua. Since the bacterial findings were negative he considered the infiltration as chemiotoxic. Albert describes a collection of pus behind the placenta and membranes that actually lifted the latter. The cases of Santi and Bereny were of abscesses in the placenta and cannot be considered analogous to ours as cases of diffuse inflammation. Heinein has described inflammation, bleeding and necrobiosis in the layer between the chorion and the decidua as causes of premature rupture of the membranes, but did not observe inflammation of the villi.

Despite thorough search and staining we were unable to find bacteria in any of our sections. The diffusion of the leucocytes, the entire absence of local abscess formation, and local cell destruction also speak against the presence of bacteria. The mildness of the infiltration points more to the picture of a diffuse subacute or chronic inflammation which we are accustomed to find where a tissue is not attacked by germs but is affected by toxic products. Moreover, no bacteria were found in the few decidua rests attached to the placenta. That microorganisms are easily shown in nonspecific or purulent inflammation of the placenta is proved from the cases of Albert, Walthard, and Seitz. For in inflammation of the placenta due to staphylococci or streptococci the conditions are different from those found in chronic inflammation due to the *Spirocheta pallida* where the active organism can only be shown relatively seldom. We can, therefore, say with certainty that in our case no pyogenic organism passed over the Nitabuch stripe and infected the chorion. The inflammatory reaction can only be explained by supposing that, like in the eclamptic patient of Seitz, toxic products from an existing irritant in the endometrium passed either directly through the Nitabuch stripe and its layer of trophoblasts or through the maternal capillaries in the intervillous spaces, and set up a sterile inflammation of the chorionic villi. Confirmatory is the diffuse character of the inflammation and the absence of necrotic foci or abscess-like formations which usually form in the vicinity of the intervillous spaces from the irritation of a pyogenic organism: staphylococcus, streptococcus, or even tubercle bacillus. Albert, particularly, refers to direct infection of the endometrium through vaginal germs, and has described this as latent microbial endometritis in pregnancy. He found in 6500 cases, during three years, eighteen such cases of infection of the decidua. Walthard has observed bacteriotoxic endometritis where the irritant,—saprophytic streptococci, staphylococci, colon and proteus bacilli,—lived in the uterine secretion but did not penetrate the mucous membrane, yet through its toxin produced an endometritis. So long as the tissue is normal it can prevent the penetration of germs; but if it becomes injured, as through disturbed circulation, then the germs lay aside their saprophytic character and become infectious parasites. If pregnancy occurs, the growth of the ovum may be uninfluenced, at least for a time (Walthard).

A preceding bacteriotoxic endometritis cannot be ruled out in our case because of the failure to demonstrate bacteria by staining methods, since they may have been in deeper layers of the decidua or in the uterine secretions. The long duration of the pregnancy, the quick fall of fever, and the smooth puerperium all speak for a mild, localized, and surface infection. The gradual decrease in the diffuse infiltration from the maternal toward the fetal side favors the conclusion that the

causes of the inflammatory infiltration are toxic substances which form on the maternal side and penetrate the fetal in decreasing strength. Weiss has described a series of cases of premature separation of the placenta in nephritis with leucocytic infiltration of the decidua where the toxic irritant was not bacterial but metabolic. That there is a direct passage by osmosis from the intervillous spaces through the fetal membranes to the amniotic fluid is shown by the case of Gusserow (sulphuric acid poisoning of the mother, positive reaction for sulphuric acid in the amniotic fluid, negative in the fetus), by the researches of Zuntz, of Wohlgemuth and Massone, and also by the cases of foul decomposed amniotic fluid in feverish mothers with normal, healthy, and active children (Briegleb, Gerhartz, Lehman, Charpentier, Lindenthal). That these latter were cases of resorption of toxic substances from the inflamed placenta into the amniotic sac and that the fever of the mother cannot be explained by the primary decomposition of the amniotic fluid with secondary resorption of the decomposition products through the fetal membranes is shown by this experiment of Gusserow on a pregnant bitch: injection of strychnine into the intact amniotic sac showed no reaction on the part of the mother; but she immediately developed tetanic convulsions when the sac was opened into the peritoneal cavity. Hellendahl demonstrated that not only toxic substances but also bacteria can penetrate the intact fetal membranes. He showed that colon bacilli introduced into the vagina, peritoneum, or blood stream of a pregnant bitch with intact fetal membranes appeared in the amniotic fluid in twenty-four hours.

Can we consider the oligohydramnios in our case as due to the inflammation of the placenta? The literature shows no case that is quite similar. The case of Franqué was rather one of hydramnios which had ruptured two days before delivery with the evacuation of a large amount of fluid, so that at delivery the case was one of secondary and mechanical oligohydramnios. The primary polyhydramnios Franqué regards as due to inflammatory separation of the amniotic epithelium which regulates the physiologic production of the amniotic fluid. Where it is missing, the way lies free for an unregulated diapedesis with excessive filtration. Similarly Forsell has observed disappearance of the cylindric cells in hydramnios and so attributes to them the duty of regulating and controlling the production of amniotic fluid, while the basal cells he regards as concerned in the regeneration of the epithelium. In our case the amniotic epithelium is entirely preserved. The few places where the inflammation has penetrated the subamniotic connective tissue and caused loss of epithelium are not important. It is different with the structure of the cells themselves. Forsell's normal differentiation of high and low columnar cells is seen in only a few places. The placental amnion

shows mainly low cylindric cells without evidence of secretion. This evidence, the before mentioned granules, so noticeable in the areas covered with high cylindric epithelium is almost entirely lacking over the placental amnion and entirely lacking over the whole peripheral amnion. The impression here is not of a broken, flattened, degenerated cuboid epithelium. If the amniotic fluid is regarded entirely or to a great extent as a product of the amniotic epithelium, as proposed by G. A. Wagner and concurred in by Hinselman, then the lack of fluid in our case is easily understood. The epithelial degeneration, evidenced morphologically by its flatness, is functionally bound up with decreased secretion. That the section in our case showed cell forms which Forsell and others found in hydramnios is not to be marvelled at with our imperfect microscopic methods, just as no microscopic change in the amniotic epithelium may be found, as pointed out by Schüller in a case of oligohydramnios. It is not difficult to recognize histologically droplets of secretion in protoplasm where it is merely a question of gross appearance between the two. However, where the process is one of a diapedesis of unstainable fluids or salts this visualization in the stained specimen is of course out of the question. So in the renal epithelium we are often unable to observe the morphologic signs of certain partial dysfunctions, cases of oligurie and cases of polyurie chronic nephritis showing the same histologic picture of the tubular epithelium. It is therefore quite likely that in both oligo- and polyhydramnios it is merely a question of partial dysfunction which we are unable to see morphologically,—in the former an abnormally low osmosis of water, in the latter, an abnormal osmosis for salt which produces secondarily a pathologic accumulation of fluid.

Fressel has lately demonstrated cases of poly- and oligohydramnios and points out in both the same microscopic findings in the amniotic epithelium: necrobiosis. Consequently he did not consider the damaged epithelium in polyhydramnios as due to overstretching but as a primary condition,—just as in oligohydramnios.

That in our case the degeneration of the amniotic epithelium is a result of subamniotic inflammation, namely, of the subchorionic connective tissue, is scarcely doubtful. The amniotic epithelium as the filter for all substances passing from the placental connective tissue directly into the amniotic sac must, to a great degree, have its own nourishment influenced by these filtered products, and it is evident that in chronic inflammation of this connective tissue the amniotic epithelium covering it would degenerate in sympathy. Where the inflammation extends directly to the epithelium it dies and is thrown off; where it is affected only by inflammatory products it remains well preserved. Its secretory function, however, is changed. The sequence is the same between chorion and amnion as between decidua and chorion. In inflammation of the decidua by infectious irritants

the toxic products penetrate into the chorion but produce here no infection, only a chronic inflammation. The products of this chronic inflammation penetrate to the amniotic epithelium and produce no longer an inflammation but a degeneration, so that the degeneration of the amniotic epithelium is the final result of a doubly attenuated infection arising in the decidua. This gradual attenuation through the double filter of chorion and amnion may well be the reason why abortion does not occur at the beginning of pregnancy as is the rule in direct infection of the placenta. The striking fact in our case that despite continued fever the patient could continue her pregnancy so long, can only be explained by the protective action of the chorion against the penetration of microorganisms. A further proof of this action is the absence of any sign of acute or chronic inflammation of the fetus. The accumulation of leucocytes in the vessels of the cord and in some of the villous vessels finds no analogue in the fetus; it is merely one of the limited placental findings, perhaps occurring in the agony of the last few hours before birth.

In the fetus itself we find malformations which can only in part be directly connected with the oligohydramnios. Malformations of the lower extremities are found in a large percentage of cases. That the club feet are a mechanical result of the oligohydramnios admits of no argument. Here the connection between lack of space as the cause and club feet as the effect is quite clear. Other forms of such mechanical damage to the fetus also occur: fracture of long bones (Link), bending of long bones (Reichel), flattening of the skull (Bonnaire and Schwab), but most frequently club feet (Merkertschianz, Hochsinger, Küstner, Jaggard, Vorlaender, etc.). The many reported cases of ichthyosis must be attributed to pressure or drying of the skin, i.e., the external effect of the oligohydramnios on the skin; not, as some authors would have it, that the ichthyosis is the cause of the oligohydramnios by its disturbance of the secretory action of the skin. Against this are the cases of ichthyosis with normal amount of amniotic fluid reported by Ahlfeld. Apparently where ichthyosis and oligohydramnios occur together the closely related epithelium of skin and amnion are similarly damaged.

More difficult to explain is the connection between kidney malformations and oligohydramnios. If the kidney malformation is regarded as the primary cause and not as an accidental occurrence then our case could add confirmation to the view that the renal secretion of the fetus plays an important rôle in the production of the amniotic fluid. This view was given a setback by A. G. Wagner, who reported many cases of aplasia or atresia of the urinary system with normal or even excessive amounts of amniotic fluid. Hinselman accepts Wagner's work, especially as since its appearance in 1913, through improved staining methods (Cunningham, Wislocki), new evidence of the importance of

the amniotic epithelium in the production of the amniotic fluid was brought out. In our case the oligohydramnios could be sufficiently explained by the degeneration of the amniotic epithelium without making it necessary to attribute it to the kidney malformation. Nevertheless the proportion of cases of oligohydramnios with anomalies of the urinary system is strikingly high. Neumann reports 9 in 45 cases, or 20 per cent. From these must be deducted those cases (and the one described by Neumann) which showed such extreme deformity of the lower half of the body that the malformation of the urinary system as being due to pressure could be excluded. Important are cases like that of Strassman showing complete kidney aplasia; or of Jaggard, showing complete absence of the left kidney and left ureter, absence of rectum, imperforate anus, right cystic kidney and double club foot. A surer proof that kidney malformation can occur without outward pressure is the case of Hürzeler: oligohydramnios, agenesis of both kidneys but no external deformities. Here, as in our case, the deformities cannot be explained as entirely due to pressure. Pressure, to cause severe changes in the pelvic organs, must, as in Neumann's case of siren, severely alter and deform the lower extremities and pelvis. Normal structure of the bones of the pelvis and lower extremities even if combined with club foot or hip dislocation rules out pressure on the pelvic organs. Such mechanical deformity may perhaps occur in cases of siren from pressure of the tightly fitting amnion on the caudal end of the fetus, preventing the free development of the pelvis and lower extremities. This connection can only be applied to a few cases. Of 72 cases of siren described in the literature Neumann can only point out four (cases of Klaus, Westphalen, Zichorius, and Lange) that were combined with oligohydramnios. In these cases the possibility that we are dealing with coordinated defects cannot be ruled out. This is the assumption of Bolk who believes the cause of siren to be a change in the germ plasm. Opposed to him are Dareste, Gebhardt, and Schwalbe who see as the primary cause a failure of development of the caudal cap. Opposed also are Slingenberg, Ahlfeld, Rabaud, and Neumann who rightly point out that the defects of development in siren are of a different nature from those cases where the cause can be traced back with certainty to a pathologic position of the amnion: deformities or amputation of the extremities by Simonart bands, etc.

Typical deformities from cramped amniotic space are found in ectopic fetuses (Winckel) which have reached a higher stage of development. Here are observed typical deformities of the extremities, club feet, crooked extremities, etc., all easily explained by outside pressure. Siren or even malformation of the urinary system, with normal pelvis, in an ectopic fetus is not described in the literature. Certainly the early and later development of the extrauterine fetus is influenced

largely by the lack of amniotic fluid. If the fluid is lost at an early period, or lack of space occurs because of poor conditions for growth then the fetus cannot go to complete or near complete development. We must conclude that when there is a direct connection between kidney malformation and oligohydramnios the latter occurs at a very early stage. Neumann finds among the 49 cases of oligohydramnios ten with malformations of the urinary system: the cases of Jaggard, Hauch, Hochsinger, Hoene, Strassman, Hürzeler, Claus, Westphalen, Cichorius, and Lange. To these are to be added Neumann's case, the one of Opitz (acute nephritis of the mother, hydrops of the fetus and placenta with oligohydramnios, atrophy of the fetal kidneys); the case of Bertkau (precipitate birth in a twenty-four-year-old primipara, half a cup of amniotic fluid, complete membranous closure of the urethra without other anomalies), and since 1923 the three cases of Vorlander without kidney malformation, and the case of Walz (sirenomelus with complete absence of amniotic fluid, absence of the genitals, atresia ani, absence of urethra, defective left radius, club foot with polydactylia [left], eloaca, in place of kidneys, a conglomerate pinhead-sized vesicle, both ureters present, as in our case). So that the statistics to date show 57 cases of oligohydramnios of which 15 present malformation of the urinary system. This percentage is not high enough to establish an absolute connection between oligohydramnios and malformation of the urinary system as cause and effect. The probability is that both disturbances are coordinate processes. In cases like ours where only certain organs are malformed, as the urinary, it speaks against pressure as the cause, for it is unlikely that the pressure would select only these organs and leave the neighboring ones untouched. Moreover, as pointed out by Ahlfeld, the decrease or disappearance of the amniotic fluid takes place in the latter half of pregnancy, a time when the anlage and development of the pelvic organs have long since taken place.

A case of unilateral long kidney with double ureter similar to ours is described by Kermauner. Fischel attempts to explain this anomaly. Employing the researches of Schreiner on the primitive kidney as a basis, he regards the final development of the kidney as a product of the meeting of the kidney bud and of the ureter bud with the mesonephros. If one of these components is lacking or fails to unite with the others then the later kidney fails to develop. Fischel proposes two possibilities for the occurrence of the long kidney: either that on the side of the double kidney more metanephrogenic tissue developed which by encroachment diverted to itself the ureteral bud of the opposite side; or that the opposite ureter itself, because of more rapid growth, grew into the metanephrogenic tissue of the double kidney, the double stimulation of the two buds producing a larger kidney from no greater amount of existing metanephrogenic tissue. Both theories rule out

conditions in the fetus as the cause of the anomalies and make it unnecessary to put forward external influences from pathologic conditions in the amnion. In our case the first theory appears the more probable.

The inflammation of the decidua and placenta can well account for the maldevelopments having their beginning at a very early stage, in fact, at the very anlage of the metanephrogenic tissue. The normally imbedded ovum is entirely surrounded by normal decidua and its nourishment, while not quantitatively equal at all points (richer at the basal part) is qualitatively the same. If, as in our case, the imbedding takes place in an inflammatory altered decidua it can well be that through the unequal distribution of the inflammation and its products, toxic substances in various concentrations penetrate the ovum at different points; or, consequent on the inflammatory hyperemia and richer nourishment, these points remain altered. The result of this is checking of the one side and overdevelopment of the other and this can well explain the left-sided anomaly in our case, possibly combined with excessive anlage of the right side. That the left side is most often affected is not entirely accident. Ballowitz pointed out that in males one-sided absence or malformation of the kidney occurred more frequently on the left side. W. Kornfeld makes the same observation. Anomalies of the kidney in females, while occurring less frequently, also appear to favor the left side, as do other one-sided anomalies in oligohydramnios (cases of Walz and Jaggard).

The question still remains whether the oligohydramnios is not really the result of the kidney malformation. This brings us to the much discussed subject as to how great a part the fetal urine plays in the production of the amniotic fluid; a problem variously and oppositely answered by different authors. In our case the kidney, though malformed was, from all indications, not disturbed in function. Microscopic section of the kidney parenchyma shows throughout normal structure, and the size of the kidney permits the deduction that it fulfilled the work of two kidneys. Moreover the parallelism between performance and size is not so exact that we can say a small kidney, by increased secretory activity, cannot excrete the same amount of fluid as a larger one. The quantity of urine excreted depends only partially on filtration, and often with shrunken parenchyma, as in contracted kidney, the amount is increased instead of decreased. If we accept lowered kidney function, then the question remains whether we must in fact attribute the oligohydramnios to the decreased excretion of fetal urine. Hinselman accepts fully the work of Wagner and with Schaller gives to the fetal urine no, or a very minor, rôle in the production of the amniotic fluid. Opitz, Gusserow, Runge, Zweifel, Dührssen, Schatz, and Neumann, on the contrary, on the basis of clinical observations and animal experimentation, regard the fetal

kidneys as the most important if not the sole producers of the amniotic fluid. They base their main argument on the large percentage of malformations of the urinary organs occurring in oligohydramnios. If these malformations are not accepted as a coordinate process of the oligohydramnios then their frequency speaks for the fetal kidney as producing at least a part of the amniotic fluid. Opposing examples are not lacking to show that the failure of the kidneys can be compensated and overcompensated by the amnion: the case of Balard,—hydramnios, dead fetus, agenesis of the kidneys; the cases of Benthin, who, in unioval twins, despite great differences in the quantity of amniotic fluid, found practically the same sized kidneys. The numerous cases of oligohydramnios with normal kidneys is clear evidence that they are not the decisive element in the production of the amniotic fluid. This fact is further borne out by those cases with a normal amount of amniotic fluid despite absence or malformation of the kidneys or closure of the urinary passages. These numerous cases of kidney malformation, with normal amniotic fluid on the one hand, and normal kidneys with oligohydramnios on the other, speak against a direct cause and effect between kidney malformation and oligohydramnios. That the fetal kidneys play some rôle in producing amniotic fluid appears reasonable from our and other cases reported. However, it is not a question of the kidneys producing a fixed amount of fluid but rather secreting a small amount of highly concentrated solution bearing no relation to the quantity of fluid produced by the amnion, but perhaps acting as an irritant to the amniotic epithelium, stimulating and continuing its activity, just as the urinary salts act as a diuretic on the kidney (Munk). Feis showed that the fetus is able to excrete through its kidneys urinary products introduced into it through the blood of the mother. Wolf was able to produce hydramnios in a pregnant bitch by performing a double nephrectomy, practically reproducing artificially the case of Opitz (hydrops of placenta and fetus, agenesis of fetal kidneys, nephritis in the mother). The action of the fetal urine on the amniotic epithelium must be imagined as a secretory activator and not merely as the producer of a mechanical diffusion toward the place of higher concentration, for such a diffusion would only equalize the osmotic pressure, while actually the amniotic fluid shows a low concentration compared to the serum (Resinelli, Jaquet, Meissel, Zangemeister, Gruenbaum). That high concentration of the fetal urine takes place, especially in prolonged labor, is proved by the frequent presence of uric acid infarcts in the kidneys of the newborn. It is, therefore, entirely logical to visualize the fetal kidneys as producing small quantities of a highly concentrated urine, and this acting as the irritant which stimulates the amniotic epithelium to secrete a fluid of low concentration.

COMMENT

Analyzing the findings in our case we believe the following to have been the sequence of events:

1. *Before pregnancy*, an edometritis not acute enough to prevent imbedding of the ovum in the decidua, but able to affect the embryo through the production of toxic substances.

2. *Through inflammatory* hyperemia one side was nourished more than the other, causing an unequal development of the fetus by favoring that side and checking the other, the result being a long kidney on the right side and aplasia on the left.

3. *An extension* of the inflammation of the decidua to the placenta, then to the chorion and from this to the amnion, where it produced in places a loss of epithelium and everywhere a decrease in its functional activity leading on to the production of the oligohydramnios.

4. *At a very early* stage of pregnancy the oncoming oligohydramnios, by pressure and mechanical cramping, produced the malformations of the lower extremities: club feet.

5. *The inflammation* of the placenta, verging on localized abscess formation in the basal portion, accounts for the premature delivery.

We find no proof that the amniotic fluid is dependent on any one specific factor. The fetal skin must be ruled out entirely. The evidence for and against the fetal urine is entirely too contradictory. We find no histologic proof of a secretory action of the amniotic epithelium. However, we believe that the amniotic fluid has its source in the interlocking action of the fetal urine and amniotic epithelium; the former activating the latter to secretion.

We find no ground for considering the malformations of the kidneys as the specific cause of the oligohydramnios, nor conversely for considering them the result of the oligohydramnios. We consider the inflammation of the decidua (endometritis) the primary and important etiologic factor. The malformations of the kidneys, and the oligohydramnios, though they do not arise synchronously, we regard as coordinate processes secondary to and resulting from the primary factor.

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While rectal examinations during labor are very convenient, they have nevertheless potential dangers, for anaerobic bacteria and *B. coli* may thereby be brought into the aseptic field. In making vaginal examinations the edge of the cervix should be strictly respected and should not be passed by the examining fingers. The cervical border separates the bacteria-free zone of the birth canal from that which contains bacteria and therefore the author distinguishes a "vaginal" examination from a "cervical" examination.

When bacteria reach the uterine cavity during the puerperium, the uterus is well contracted and no harm usually results. However, if bacteria should reach the uterus during labor, infection is the common result. A cervical examination favors the premature introduction of bacteria. Thus is explained the connection between cervical examination and early puerperal infection. In making a vaginal examination the proper procedure is to palpate the fetal head by passing the fingers up to the fornices of the vagina.

J. P. GREENHILL.

ECTOPIC ENDOMETRIUM IN THE OVARY AND INGUINAL CANAL*

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DURING the past few years the gynecologic world has been much interested in the subject of ectopic endometrial tissue, largely through the magnificent research work of Sampson. The theory which he propounded of endometrial implantation on the ovary and other pelvic structures has served to stimulate investigators in renewed effort to establish the origin of this puzzling condition.

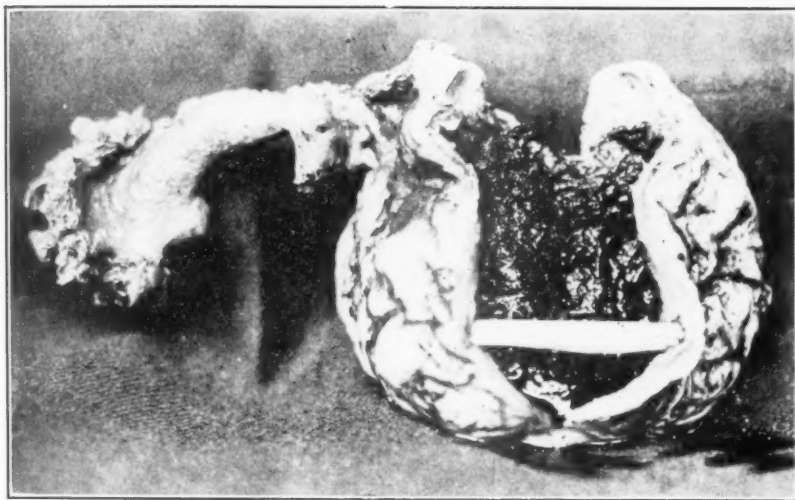


Fig. 1.—Chocolate cyst of right ovary, and the right tube.

Much has been written for and against the theory and Sampson himself has kept an open and unbiased mind as to its application in all types of cases. It is therefore with no thought of establishing a concept of the origin of heterotopic endometrial tissue, but rather to put on record my observations that I present this case, which recently came under my care.

Miss S., aged 30, had noticed a lump in the right inguinal region near the large labial fold, for the past five years. This lump was slowly getting larger and more annoying to the patient. During her menstrual periods, which were normal in every

*Read at a Joint Meeting of the Chicago and St. Louis Gynecological Societies, at Chicago, December 4, 1926.

way, the mass would become tender and slightly larger, and at this time she would also have rather severe pain in the right lower abdomen.

In the small town from which she came a diagnosis of hernia was made and



Fig. 2.—Tumor mass from right inguinal region showing round ligament grasped in forceps.

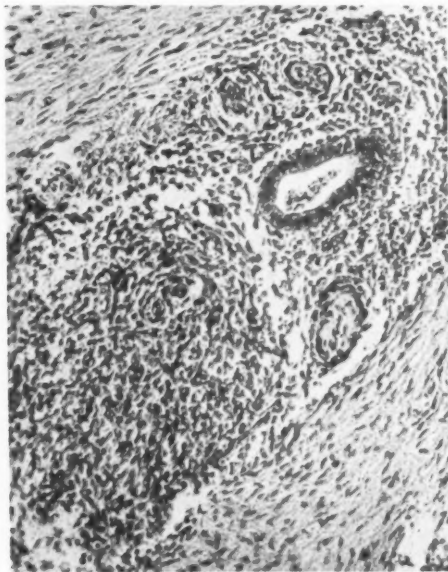


Fig. 3.—Typical endometrial gland surrounded by stroma taken from inguinal mass.

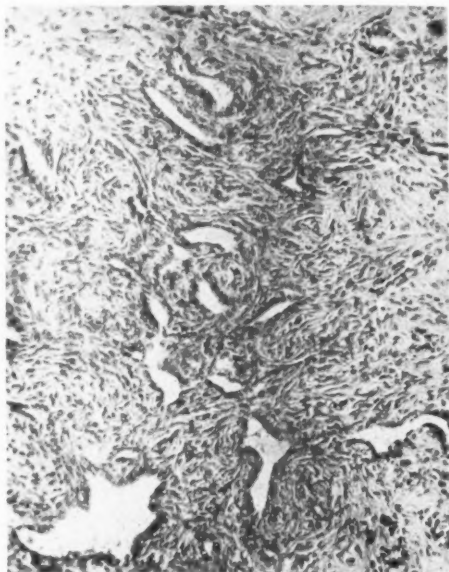


Fig. 4.—Tissue spaces lined with epithelioid cells arranging themselves into gland-like formations.

operation advised. This did not satisfy the patient, and she came to St. Louis, where she was referred to me.

Examination showed a poorly nourished, poorly developed, extremely nervous woman, with no demonstrable organic lesions, except that in the right inguinal region, extending well over toward the mons and down under the right labial fold,

a firm, slightly tender fixed mass about the size of a large hen's egg could be palpated. Everything else externally was normal.

Vaginal examination showed a cystic tender rounded tumor mass, in the region of the right ovary, about the size of a small orange, or tangerine. The rest of the pelvis was normal.

A diagnosis of tumor of the right round ligament and a right ovarian cyst was made and operation advised.

At operation the abdomen was opened in the midline and a typical large chocolate cyst of the right ovary exposed. This, together with the right tube were removed and, as all other organs were normal, the abdomen was closed (Fig. 1).

A second incision was next made over the inguinal canal, and the mass carefully dissected free. It was firmly adherent to the pubic arch, and extended well into the upper large labia. As the dissection proceeded, the round ligament became

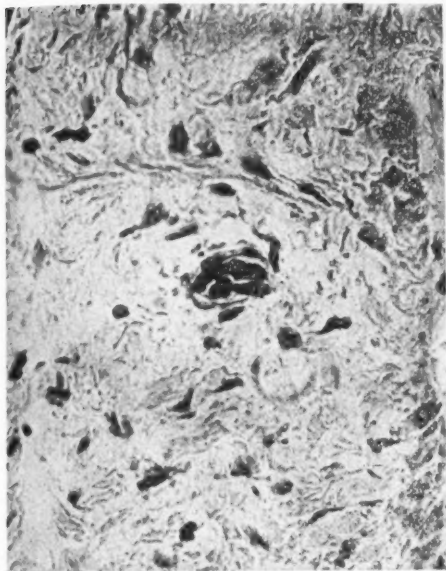


Fig. 5.—Large cell elements passing along the lymphatics or tissue spaces.

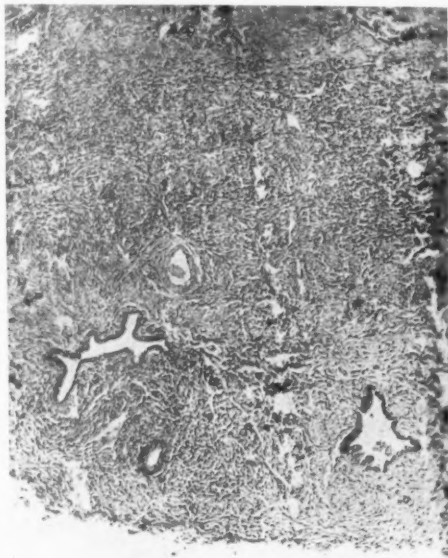


Fig. 6.—Gland-like structures from rim of chocolate cyst opposite hilum of ovary. No endometrial stroma.

visible and was found to terminate abruptly in the mass so that when the latter was completely freed from its bed, it was attached to the ligament much as a pear is attached to its stem. The round ligament could be freely pulled in and out by making traction on the growth, but no connection existed between the canal bed and the abdominal cavity. After removing the mass the ligament was firmly sutured to the facial planes, and the wound closed without drainage. Uneventful recovery (Fig. 2).

Histologic examination revealed the very interesting structures so characteristic of ectopic endometrium. The inguinal mass proper being made up of large clumps of gland tissue surrounded by deep layers of endometrial stroma, with frequent hemorrhagic areas, the whole being imbedded in a firm connective tissue framework (Fig. 3).

Sections from the cystic ovary showed glandular tissue with less distinctly marked stroma, but very closely resembling certain areas found in the tumor mass proper.

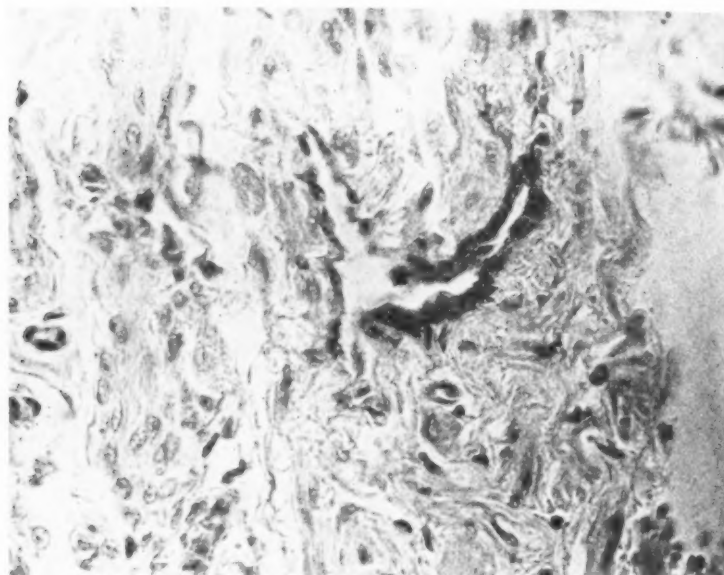


Fig. 7.—Active proliferation of endothelial lining of a small capillary or lymphatic space.

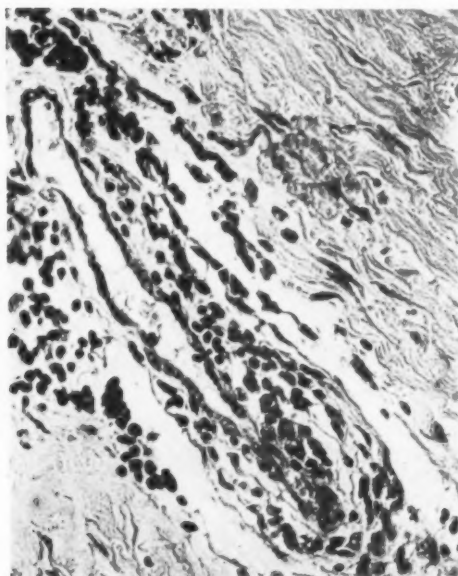


Fig. 8.—Capillary vessel showing early endothelial proliferation surrounded by cells which are indistinguishable from stroma cells.

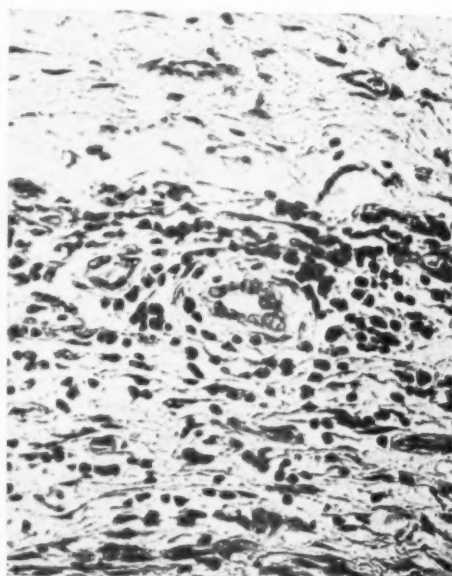


Fig. 9.—Cross section of small capillary with endothelial proliferation surrounded by cells indistinguishable from stroma cells.

The inner wall of the chocolate cyst was covered with a layer of flattened epithelium broken in places with free blood just beneath the surface, which in spots streamed out into the cyst cavity. Marked congestion in all vessels was a prominent feature.

In another portion of the cyst wall a most peculiar group of structures was present, consisting of spaces lined with epitheloid cells which seemed to arise from the surrounding tissue, and which cells were definitely arranging themselves into gland-like formations of a very early type (Fig. 4).

Again we see in the inguinal tumor proper large cell elements, passing along the lymphatics and tissue spaces, forming small clumps here and there without further differentiation (Fig. 5).

Thus far the ovarian sections have been taken from the upper pole of the cyst where embryonal remnants might be expected to exist. A section was therefore made from the most distant portion of the cyst wall opposite the hilum of the ovary, and again definite gland structures were encountered with, however, no indication of endometrial stroma (Fig. 6).

In another segment of the cyst a small vessel or tissue space is seen where portions of the endothelial lining seem to be in a state of active proliferation (Fig. 7).

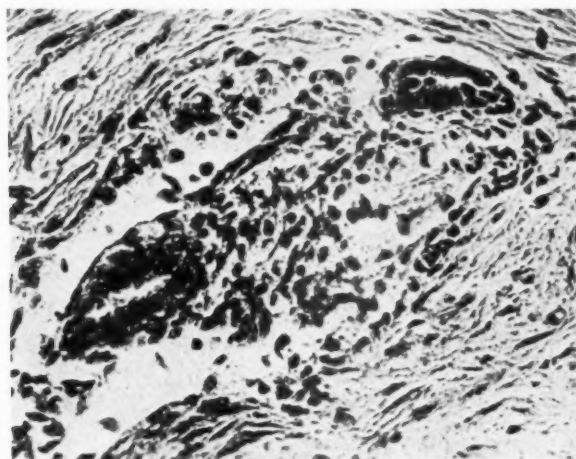


Fig. 10.—Early gland formation with stroma cells closely resembling capillaries with endothelial proliferation.

Lastly, in sections taken from the inguinal mass, we see numerous capillary vessels showing various degrees of proliferation of their endothelial lining, surrounded by cells which are indistinguishable from stroma cells, taking on characteristics which so closely approach typical endometrial tissue that the presumption of the origin of ectopic endometrium from capillary endothelium, is strongly suggested (Figs. 8, 9, 10).

It is hardly within the province of one whose experience is limited to a single case to interpret the various pictures here presented. If one may be permitted, however, to speculate a bit, various avenues may be opened for further discussion.

The coincidence of a tumor mass in the inguinal region entirely extraperitoneal, and a growth in the ovary on the same side, both showing histologic pictures which are quite similar in character, is most interesting.

That the extraperitoneal growth did not arise from an endometrial implant is quite clear. How then did the ectopic tissue reach this area?

Whether the large cell elements coursing along the lymphatics as seen in one of my sections, is an indication of a metastatic process linking the inguinal growth to the ovarian cyst, can only be surmised. If true, it would meet the metastatic conception of Sampson, but not in the sense of a transportation of complete endometrial units, as pictured in his sections, but rather as primordial cells with a capacity for further differentiation, or at least possessing stimulating qualities which would tend to bring about cell proliferation in the capillaries through which they pass.

The areas of primitive gland formation seen in the various sections may perhaps give us a clue as to the origin of this peculiar growth. One of two possibilities exists here; either we are dealing with primary cells, embryonal in character which are now taking on a higher form of differentiation, or we are dealing with a metaplasia of the endothelial cells which line the finer capillaries and lymphatics throughout the tumor.

Obviously, it is impossible for me to state which condition exists, but an impression gained from a careful study of my slides, would lead me to incline toward the idea of a metaplasia. This impression is strengthened by the experience gained in my study of endotheliomas of the ovary and by the very suggestive behavior of the endothelial lining of the capillaries and lymphatics which can be noted in my section.

501 METROPOLITAN BUILDING.

PRIMARY CARCINOMA OF FALLOPIAN TUBE, WITH REPORT OF THREE CASES*

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THE earliest authenticated case of this rare condition, reported by Orthmann in 1888, was quickly followed by a case of Doran's and one by Kaltenbach in 1889. As previous writers, even Schroeder, in 1887, had denied the probable existence of such a condition, few came to light and even in 1892 Zweifel regarded it as an extremely rare entity.

With the advancement in the pathologic study of material, many more cases were reported, Peham collecting 61 in 1903, Orthmann 84 by 1906, Doran 100 by 1910, and Bower and Clark 133 cases in 1925, which they felt were all unquestionable. Now some 200 odd cases have been reported. To give a little better idea in comparative fig-

*Read before the Section of Obstetrics and Gynecology of the New York Academy of Medicine, December 28, 1926.

ures, Vest in 1914 found 4 out of about 19,000 gynecologic admissions to Johns Hopkins Hospital and we have seen 3 in about 30,000 similar patients at Bellevue Hospital since 1911. Thus, it begins to assume a frequency to force our consideration when we are dealing with adnexal conditions.

Theoretically, as regards its method of origin, there have been two main schools led by Doran and Fearn, and Sänger and Barth. The former believe it to represent a malignant change occurring in a benign papillomatous condition of the tube lining, resulting from a preexisting salpingitis. A case described by Roberts illustrates this view nicely, showing a tube filled to overflowing with a papillary growth and giving a history of sanguineous vaginal discharge similar to that found in the tube. Sänger and Barth, with a theory mentioned for consideration by Ewing, on the other hand, believe it occurs a long time subsequent to a chronic, probably purulent, inflammation of the tubes, usually occurring about the time of the climacteric. Though we find that a number of the unilateral cases are accompanied by such a chronic process in the opposite tube, and others by tubo-ovarian cysts, reminding one of the retort-shaped tuboovarian abscess, it is impossible, of course, to determine whether this inflammatory condition was existent prior to or concomitant with the carcinoma.

It seems hard to reconcile all of these premises, however, with Bower and Clark's case at twenty-five, Norris' at twenty-seven, and ours at twenty-nine and thirty-one years of age. In fact the first mentioned, a para ii, had a child four years previous to the discovery of the neoplasm, and our youngest patient, who miscarried, following extreme exertion, six years before her present illness, whereas Thaler's patient aborted only four months before the carcinoma was found.

Vest, in attempting to cover the premise, and also the pronouncement of many investigators that it was less common in parous women, found that in 112 of his 132 cases, collected from the literature up to 1914, 79 had been pregnant, 73 delivering living children and 6 aborting. In trying to decide whether these patients had suffered from a prior or subsequent tubal inflammation, he found that few gave any suggestive history. The 70 per cent who became pregnant were probably free of salpingitis, or it was either unilateral or not sufficient to prevent conception, or it must have developed after delivery, which last seems improbable on the face of it. He also figures that if the primiparae, i.e., 28.4 per cent, all suffered one child sterility from a later infection, and that the sterile patients were all sterile on account of tubal inflammation, making a total of 57.7 per cent who may have had a tubal infection, this leaves 42.3 per cent of cases of primary tubal carcinoma which probably had no previous inflammation, and these we must explain on some other basis.

However, several workers, L'Esperance, Stubler, and Stanea, have

found this neoplasm associated with tuberculous inflammations of the tubes, presumably of long standing.

Ruge and Vest both draw attention to the great frequency of chronic inflammatory tubal processes,—gonorrheal, tuberculous, and postabortal,—and the distinct rarity of primary carcinoma; Cameron, in a symposium on pelvic neoplasms held by the Obstetrical and Gynecological Section of the Royal Medical Society of London, stated that he does not believe that inflammation necessarily precedes this new-growth.

Attention is drawn by many writers, namely, Goodrich, Bower and Clark, Guillemin and Marlot, to the fact that in the early cases the gross appearance was that of a mild chronic salpingitis with adherent or clubbed tubes. This has been our own experience, and it has been reported at all stages between this and large indefinable pelvic masses as described by Quin and Solomons. The lesion is most frequently found in the middle and outer thirds of the tube, often distending it with a papillomatous mass which may be accompanied by a serosanguineous or purulent fluid, and gives the tube a firmer feel than that of the hydrosalpinx or tuboovarian cyst it appears to be. It is frequently bilateral, as found by Phillips, Leuret and Leroux, Kalmann, Vest, Kuestner, Bower and Clark; Knoop and Cameron say that these constitute one-third of the cases, the tumors frequently being of unequal size. Vest's theory of transmigration of material from the end of one tube to the lining of the other, similar to the transmigration of the fertilized ovum, is attacked purely on the basis of the statement of Doran, one of the most active British investigators in this field, that the affected tube closes off the fimbrial end early, and this is used in favor of primary bilateral carcinoma by Kalmann and Schäfer.

Of the 141 cases of which we have the age, we find a majority, i.e., 50.3 per cent, occurring between the ages of forty and fifty, with the youngest reported at twenty-five years by Bower and Clark, and the oldest, Pawlik's patient, seventy years (sic Novy).

The dictum of Doran that the growth follows the line of least resistance, except that the ostium closes early, is a general description of its method of spread (Bower and Clark). Thus:

1. It may rupture the wall of the tube both by distention and due to the weakening by infiltration of the newgrowth.
2. It is frequently spread by the lymphatic stream, a broad outlet.
 - a. Toward superior lumbar group leading to metastasis to the corpus utero.
 - b. Along the external iliaes, hypogastric, and sacral glands and may involve the cervix.
 - c. Or follow the lymphatic drainage of the ovary and fundus uteri toward the kidney and back to group near aorta.
3. By contiguity, even through the uterine end of the tube to the endometrium or uterine wall, or out the fimbriated end to the ovary.

Besides the frequent metastases in the genital tract, with early involvement of the retroperitoneal lymph nodes, it frequently metastasizes to distant organs or structures. Mantel describes a case in which metastases occurred in the liver, Schweijkart one in which it occurred in the abdominal wall, Thaler in the appendix, and Kurtz in the clavicular lymph nodes. Many early cases, however, are well confined to the tube or tuboovarian mass. Cameron mentions that ascites is uncommon except with peritoneal metastasis, and Bower and Clark found a small amount of serosanguineous fluid in the abdomen in their case which showed beginning spread.

Etiology.—Occurring principally between the ages of forty and fifty years, though cases are reported from twenty-five to seventy years, it seems to vary little between nulliparous and parous. Cameron believes it to be as frequent in one as the other, though salpingitis may be a predisposing factor.

Symptoms.—These are not distinctive. An irritating clear watery discharge in a patient past the menopause, where the cervix and corpus uteri can be proved cancer-free, the last mentioned authority considers reason to suspect cancer in the tube. Many have mentioned that this discharge may be blood-stained (Andrews, Ruge), and it at times comes in gushes, as in hydrops tubae profluens. Of course, we can frequently feel a pelvic tumor which may be sausage-shaped, and Doran found a majority of the patients in his series had pain. Ruge and Heil mention that carcinomatous material may be found in the discharge from the tube or occasionally in curettings. Stanca claims that whereas ovarian carcinoma is usually bilateral, this tumor generally (66 per cent) occurs on one side, and occasionally, as in Fleischmann's case, metrorrhagia will be the principal symptom.

With regard to treatment, the opinion seems unanimous in favor of complete hysterectomy with removal of all palpable lymph nodes in the retroperitoneal groups, and Biar and the later writers recommend deep radiotherapy to follow. The prognosis is regarded as bad by almost all, though Bower and Clark report that in a collected series of 133 cases in which they had no doubts, the mortality (including cases reported to have recurrences) was 48.1 per cent, i.e., where the removal had been considered complete 40.2 per cent and where definitely incomplete 59.8 per cent.

Pathology.—The tumor growth is of two types, the papillary and the alveolar, the papillary being more frequent according to Sanger and Barth, and, though frequently malignant from the start, may occasionally represent a malignant degeneration in a benign papillomatous process. That the papillary type is merely an early form of the alveolar is the view of Stubler, Kustner, and Kehrler.

As regards malignancy, Lipschitz found only 4 patients out of 144 alive after four years, and his series included a number of doubtful

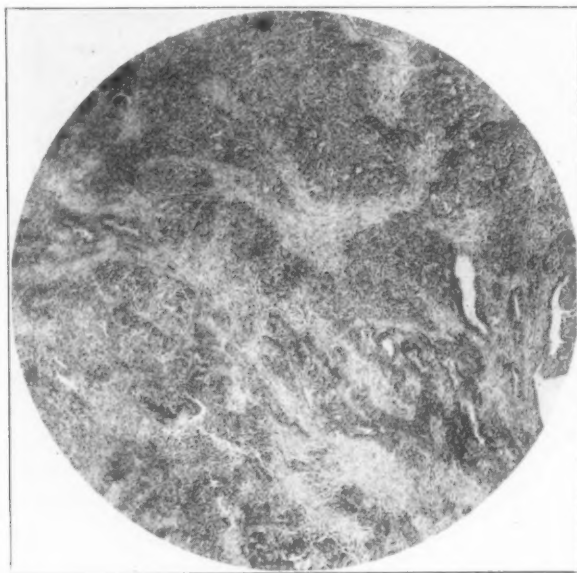


Fig. 1.—Case 1 (low power). Papillary carcinoma, occluding the lumen and infiltrating and destroying the walls of the tubes.

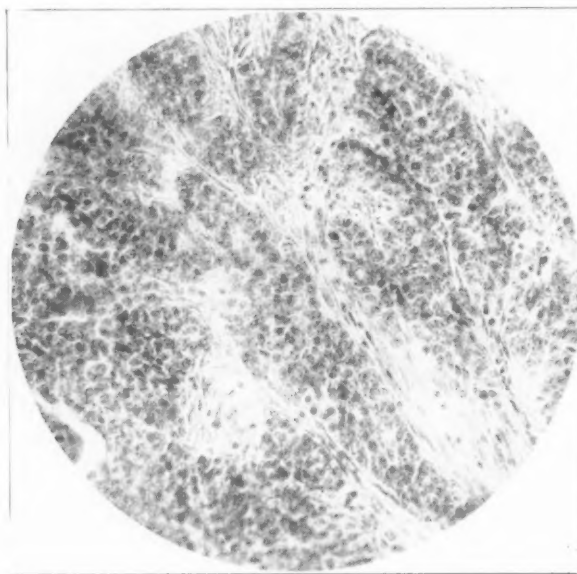


Fig. 2.—Case 1 (high power). Photomicrograph showing papillary outgrowths.

diagnoses; he regards it the most fatal of all carcinoma of the pelvic organs. Kurtz, in 1926, found only 7 cured for seven years.

On the basis that the fundus uteri is involved early rather than the ovaries, supravaginal hysterectomy is usually believed to be sufficiently radical, if all enlarged lymph nodes are cleaned out; Bower

and Clark were willing to leave the ovaries in situ in a twenty-five-year-old patient.

The uterus may suffer from direct extension to the endometrium due to extension from the uterine end of the tube already involved (Thaler, Boxer, Ries, Mueller), occasionally forming a pedunculated nodule near the tubal orifice (Fabozzi, von Franque); or the lymph spaces in the uterine wall may be loaded with cancer cells as seen by Bland-Sutton and L'Esperance.

One recent case was particularly interesting because the malignant change was confined to a small area at the uterine end of the tube, and the rest of the tube on serial sectioning showed no growth. She also had amenorrhea for three months with moderate pelvic pain. None of our three patients was near the menopause.

CASE 1.—S. G., aged thirty-one, Russian widow, dressmaker, admitted to hospital July 28, 1914, with pain in right side of abdomen and in lumbar region. No previous serious illnesses, para ii, one child 10 years of age, and one miscarriage, seven years before admission. Her menstrual periods began at twelve years of age, regular every four weeks, of 3 day duration. Slight premenstrual pain. For past four months periods have been irregular. Present illness dates back to onset of irregularity in menstrual periods, during which time she has noticed a vaginal discharge and pain in lumbar region and right side of abdomen. No vomiting, fainting, or dysuria.

She had a posterior colpotomy done and left the hospital August 21, about four weeks later, unimproved. She continued to have severe pain principally in left lower abdomen and left iliac region and was readmitted November 11, 1914, complaining also of loss of sleep and weight, feeling feverish and inability to work. A foul yellow vaginal discharge was noted and her posterior colpotomy wound was still open. The fundus was not palpable, but a hard adnexal mass was felt on the left. On December 8, 1914, a laparotomy was done and part of the right fallopian tube, the entire left tube, and the left ovary were removed. In appearance the right ovary was normal; the outer end of the right tube was enlarged and appeared inflamed; the left tube and ovary were matted together in what appeared to be a much inflamed condition and were removed *en masse*. This was found to be a primary carcinoma of the fallopian tube, involving both tubes and the left ovary. She left the hospital December 25, 1914.

Her next admission was April 14, 1915, when she was found to have hard, insensitive masses in the pelvis, a cauliflower growth in the upper vagina, and a large mass connected with the fundus. She was discharged unimproved April 22, 1915, almost exactly nine months after a first admission and only thirteen months after the onset of symptoms, with a hopeless recurrence.

CASE 2.—V. C., aged forty-two, Austrian, married, occupation housework, was admitted November 21, 1914, complaining of pain in right lower abdominal quadrant, with pain on defecation and urination.

Her family and past history were essentially negative. Menstruation began at eighteen, was regular every twenty-eight days, each period lasting three days. Dysmenorrhea and comenstrual backache for past ten years, associated with passage of clots for three years. Her last period was two weeks before admission. She had had one miscarriage at six months, sixteen years previously, and no other pregnancies. She had had pain on urination and defecation for twelve or fifteen

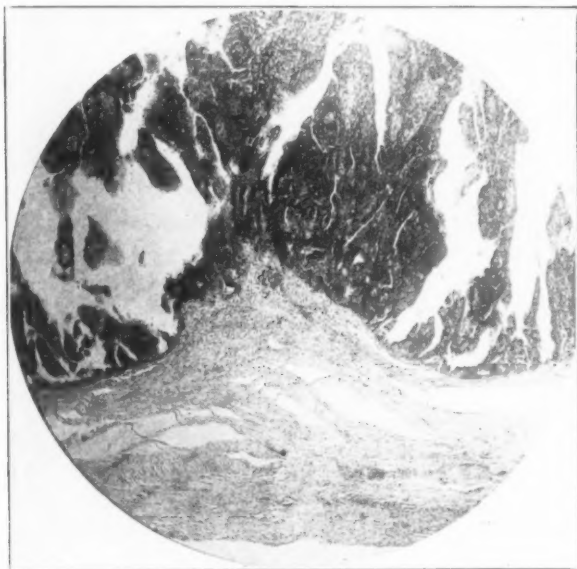


Fig. 3.—Case 2 (low power). Tumor showing papillary outgrowths into lumen of tube.

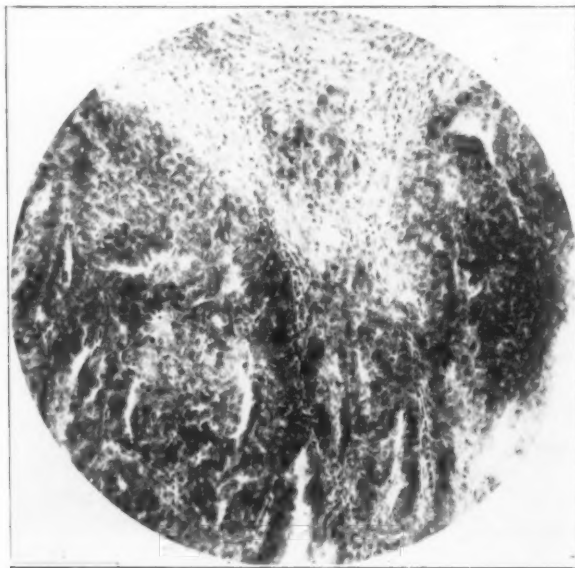


Fig. 4.—Case 2 (high power). Papillary carcinoma springing from the walls and growing into the lumen.

years. Three months previous to admission, this became aggravated and pain in her right lower abdominal quadrant developed and became continuous. She menstruated every two weeks for three months previous to admission, with lumbar backache and clots. She had lost fifty pounds in three years.

On physical examination there was nothing abnormal noted except in the pelvis. The fundus uteri was enlarged to the size of a grapefruit, especially anteriorly,

irregular in outline, one nodule on right just above symphysis pubis. At operation two days later a large fibroid was enucleated from the uterine wall. Both tubes and ovaries were much enlarged; the ovaries were cystic in appearance, and the tubes looked like large hydrosalpinges, the right being much larger. Whereas the right adnexa formed a large tuboovarian cyst, the left tube was firmly adherent in the bottom of the culdesac and separate from the cystic left ovary.

A bilateral salpingo-oophorectomy was done and the pathologic report read primary carcinoma of the tube. This patient had a negative Wassermann and her temperature, pulse, respiration, and blood pressure were within normal limits.

She was discharged in apparent good health December 10, 1914, but when readmitted on April 7, 1915, four months later, she was in very bad condition. She had marked ascites, complained of extreme weakness and emaciation, obstinate constipation alternating with diarrhea, dysuria, dyschesia, and passage of vaginal clots.

The following day paracentesis was performed and 3740 c.c. of bloody fluid were removed, revealing a large tumor mass in right adnexal region. She failed rapidly and died May 8, 1915, just six months from the time of operation and nine months from the onset of her symptoms referable to this condition.

Here we have two marked demonstrations of the futility of conservatism in this condition, with recurrence in six and nine months respectively.

In both of these cases the diagnosis was not made at the time of operation, which was also true in our third case.

CASE 3.—N. W., aged twenty-nine, married, born in Austria, occupation housewife. Admitted to hospital November 11, 1926, complaining of mild pain in left lower abdominal quadrant, and atypical bleeding for three days. She had been married ten years, had one child 9 years old, normal labor, puerperium uneventful, one miscarriage at two months in 1920 following overwork, not induced. As an adult she had influenza in 1918 and a laparotomy for appendicitis in 1922.

Menses began at age of seventeen, regular every twenty-eight days, moderate in amount, preceded by slight pain. She had no leucorrhea or dysuria, but had noticed nocturia for five weeks. Her last menstrual period was August 23, 1926, apparently as usual. She skipped her September and October periods and had a bright red flow, moderate in amount, for three days before admission, which was preceded by slight pain in left lower quadrant.

Laparotomy three days after admission revealed a uterus normal in size, adherent to the omentum; both tubes were chronically inflamed, without much enlargement, and adherent to cystic ovaries, about six cm. in diameter, and also somewhat adherent to peritoneum of culdesac. The tubes were excised at the cornua, the round ligaments sutured to the back of the fundus uteri, and the ovaries removed. A small piece of ovarian tissue which appeared normal was implanted in the right rectus abdominis and sutured there. On discharge, November 30, 1926, her abdominal wound was healed by primary union and there was no adnexal induration or tenderness. She was instructed to return in two weeks for transfusion and radical extirpation.

Before operation her temperature was half a degree subnormal each morning, the blood count 4,900,000 erythrocytes, 80 per cent hemoglobin, 8000 leucocytes, with 65 per cent polymorphs and nearly 35 per cent lymphocytes, and she had a negative Wassermann.

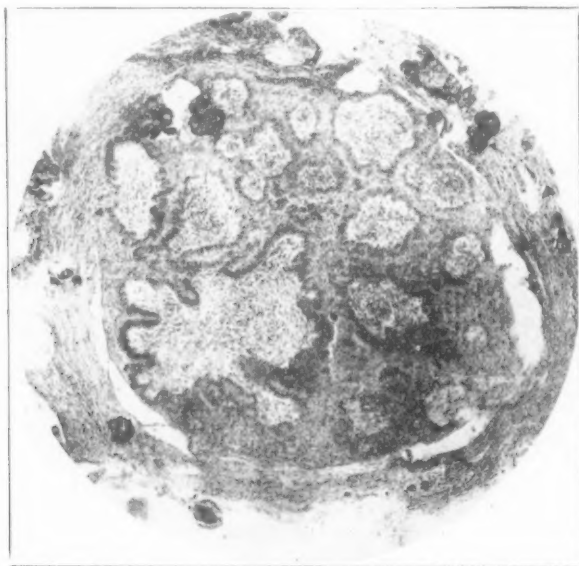


Fig. 5.—Case 3 (low power). Papillary carcinoma, with pseudoalveolar formation and areas of calcification.

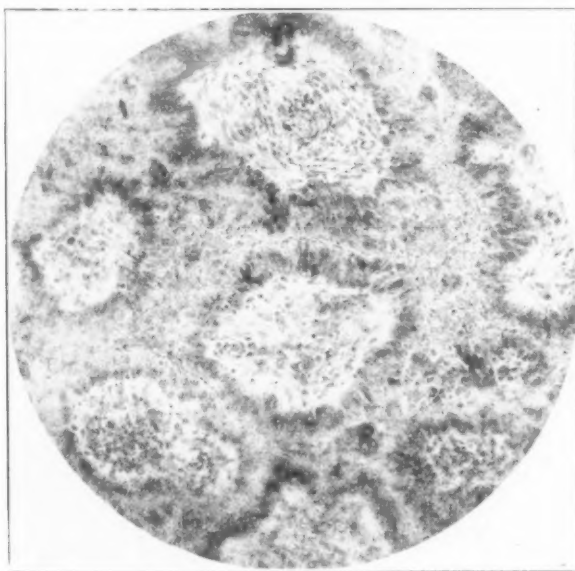


Fig. 6.—Case 3 (high power).

In this case we had the pathologic report before discharge and hope a radical operation may give a better result than in the other two.

CONCLUSIONS

1. Though the age incidence of carcinoma of the fallopian tubes is largely between forty and fifty, we must watch for it in all adults.

2. Grossly, it frequently cannot be differentiated from chronic inflammatory lesions if removed intact.
3. Radical extirpation, including all near-by palpable lymph glands, is the procedure recommended by most writers.
4. The frequency of this growth requires our attention in all cases of apparently inflammatory pelvic disease.
5. The diagnosis is usually established only by histologic examination.
6. Incomplete removal of the pelvic contents is not a satisfactory method of treatment of this condition.

I wish to express here my indebtedness to Drs. Symmer and Carabba of the Pathologic Department of Bellevue Hospital for their invaluable assistance.

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IS MAGNESIUM SULPHATE INTRAVENOUSLY WARRANTED
IN ECLAMPSIA? CLINICAL RESULTS VS.
EXPERIMENTAL EVIDENCE

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IN a paper entitled "Studies in Anesthesia, Anoxemia, Anhydremia and Eclampsia, with Certain Deductions Concerning the Treatment of Eclampsia" (AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY, November, 1926), H. J. Stander of Johns Hopkins Hospital, comes to the conclusion that "the chemical and pathologic findings with magnesium sulphate speak against its use in eclampsia; but further work is necessary before a definite conclusion can be reached." The use of magnesium sulphate is deprecated no less than three times in the short consideration of magnesium sulphate in the rather extensive study referred to; qualified each time, however, by the statement that further experimental work must be done before any definite or sweeping conclusion can be reached.

This clinical conclusion was based entirely on experimental work on two dogs; the clinical results which had been reported from both the intravenous and the intramuscular use of magnesium sulphate being entirely ignored.

To one of his dogs Stander gave 50 c.c. 50 per cent $MgSO_4$ solution subcutaneously and to the other 6 c.c. 50 per cent solution intravenously. As a result, he found "marked fatty changes in the liver. The section also shows numerous dilated capillaries and many spaces filled with blood. There were no, or only slight, changes in the kidneys." As to the blood chemistry he says, "The only changes observed are a lowering of the CO_2 combining power and a slight increase in the blood sugar." From these observations, the above quoted conclusions were reached.

The tremendous dosage used must certainly have been toxic, closely approaching the lethal dose. In Meltzer's report of his original experiments (*Medical Record*, Dec., 16, 1905) with magnesium sulphate, he says of the intravenous injection, "If injected very rapidly, 0.1 of the salt will produce a profound toxic effect, but in a very slow injection, nearly 1.5 of the salt can be administered without any visible poisonous symptoms." And further, he says, "Larger doses of the salt are fatal also by subcutaneous injection."

The dosage used by Stander, 3.0 intravenously, is thirty times the minimum dose which if injected rapidly will produce profound

toxic effects and over twice the maximum dose which might be administered by very slow injection without any visible poisonous symptoms, according to Meltzer.

The fallacy of drawing any deductions from the effects of such a highly toxic, if not actually lethal dose in the dog and applying it to the therapeutic dosage in women, is obvious.

The clinical results reported from the intravenous use of magnesium sulphate showing a corrected mortality in one hundred cases of 9 per cent, should be given some consideration in appraising the value of the treatment. This result was obtained not only in the Los Angeles General Hospital, but the report included forty-nine cases treated by doctors outside of this hospital. Dorsett (*AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY*, February, 1926), using 15 cc. of a 25 per cent solution $MgSO_4$ intramuscularly, reports thirty-eight cases, with two deaths.

In our last report (Lazard, Irwin and Vruwink, *AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY*, July, 1926), we included forty-five preeclamptic cases in which this treatment was used, in only six of which convulsions developed.

These cases seem to me to have an important bearing on this question; as, if this use of magnesium sulphate tends to further embarrass an organism already overloaded with toxins, as Stander seems to fear, one would expect its use to tend to increase the danger of eclampsia supervening in the preeclamptic.

One of the preeclamptic cases (Preeclamptic case No. 29) an outside case, received twenty-four injections of 20 c.c. $MgSO_4$ each in the course of twenty-three days; she did not develop eclampsia and was delivered by cesarean section because of a placenta previa. Both mother and baby made good recoveries.

If the effect of magnesium sulphate in therapeutic dosage on the blood and liver were deleterious one would expect a patient, on a constant daily ration of intravenous magnesium sulphate for over three weeks, to show some bad effects.

CLINICAL CASES

In the past nine months, a number of preeclamptic cases, of both the nephritic and of the true eclamptic type, received intravenous injections of magnesium sulphate as a prophylactic against the development of eclampsia. The results have been most gratifying as none of these patients developed eclampsia.

One of these patients was admitted to the hospital nine days postpartum for medical care, a nephritic, with a history of having had abscessed teeth extracted in 1917; influenza in 1918; and a tonsillectomy and ethmoid operation. She had been pregnant five times, the first ending in an abortion at ten weeks, the second with a stillbirth at seven months, the third, a stillbirth at seven months and the

fourth with a stillbirth at eight months. During the last pregnancy she was under the care of Dr. J. M. Harris, of Los Angeles, from February until her delivery August 5, 1926. She had high blood pressure and albuminuria. In addition to the usual dietary care and bowel regulation, she received MgSO_4 intravenously, every other day. She received thirty-eight injections of 20 c.c. each from June 15, 1926 until labor was induced on August 5, 1926 at the thirty-sixth week of pregnancy and resulted in spontaneous birth of a living baby. This patient as a result of her five pregnancies has one child, which, in view of her previous experience can, I think be credited to the intravenous magnesium sulphate treatment.

The clinical records of three others of these cases (Cases 1, 2 and 3), are appended to this paper, as illustrative of the clinical results we have obtained.

CASE 1.—A nephritic, was treated in two pregnancies. On her first admission she was in an eclamptic state, having had five convulsions before admission in coma. She had no more convulsions after the first injection of MgSO_4 and had a total of four injections of 20 c.c. each before her spontaneous delivery of a seven months stillborn fetus fourteen days after the eclamptic attack, without any recurrence of the convulsions. She was readmitted in her second pregnancy, six months later, in her fourth month, because of a toxemia. Her blood pressure was 178/110. Under the usual dietary restrictions and with two prophylactic injections of 20 c.c. each her condition markedly improved and her blood pressure came down to 140/80. She was dismissed from the hospital to the care of City Maternity Service as an out-patient. She was readmitted December 5, 1926 at full term, with a blood pressure 200/120 and was given another course of four intravenous injections of MgSO_4 before her spontaneous delivery of a full-term living baby four days after admission, no eclamptic attack occurring. It would probably have conserved the future health of this patient, a definite nephritic, to have interrupted her pregnancy and sterilized her when she came under observation with toxic symptoms in the fourth month of her second pregnancy. But, as she had no children, she desired to go on. On her admission at term, it was planned to do a cesarean section and sterilization, but she delivered spontaneously the night before the operation was to be done. She will be urged to submit to sterilization as soon as she is in proper condition, as further pregnancies would undoubtedly result in further and possibly fatal injury to her already badly damaged kidneys.

CASE 2.—This patient, also a preeclamptic of the nephritic type, was treated prophylactically for twenty days, receiving thirteen injections of 20 c.c. each, before induction of premature labor. Labor was induced because her condition did not improve and there were beginning eye ground changes. She was spontaneously delivered of a premature living child. After her delivery, her blood pressure continued high and on December 13, 1926, nine days postpartum, she was found to have a partial detachment of the right retina in the lower nasal quadrant and of the left retina in the upper nasal quadrant. Intravenous MgSO_4 treatment was continued. Her vision improved and December 15, eye examination showed "both detachments much less marked, fundi clearing rapidly." She was discharged with her baby, both in good condition, on December 23, and referred to the medical clinic for further treatment.

CASE 3.—A preeclamptic of the true eclamptic type, in her thirty-sixth week of pregnancy, had sixteen prophylactic injections of 20 c.c. each, and although her general condition was apparently favorably affected by the injections, the blood pressure remained high, on two occasions reaching 210 and 212 systolic, respectively. She did not develop eclampsia and went into spontaneous labor, fourteen days after coming under treatment. A premature living child was delivered by forceps extraction. Mother and child made a rapid and uneventful convalescence.

These cases together with those heretofore reported, both of the eclamptic and of the preeclamptic type, seem to me to more than justify the continued use of magnesium sulphate, intravenously, whatever may be the immediate, and probably rapidly passing, effects on the blood chemistry.

BLOOD CHEMISTRY STUDIES

Since reading the article by Stander, I have had some studies made to determine what, if any, the effects are on the blood chemistry of toxic pregnant women of therapeutic doses of magnesium sulphate, given intravenously. Table I shows the results of this study in three cases, ten of the readings being "before and after" the intravenous use of MgSO_4 .

TABLE I. EFFECT ON BLOOD CHEMISTRY OF MgSO_4 , INTRAVENOUSLY IN THERAPEUTIC DOSAGE

CASE	DATE	SUGAR	N.P.N.	PREFORMED CREATININ	URIC ACID	CO ₂ COMBINING VOL. PER CENT	REMARKS
1 Nephritic Eclampsia 1st Preg.	12-26-25	166	50	2.5	7.2		4 injections of 20 c.c. each in interval.
	1- 7-26	100	50	1.6	4.0	38.0	
	12- 7-26	90	27	1.2	4.0	45.3	
Nephritic Preeclampsia 2nd Preg.	12- 8-26 Before MgSO_4	69	31	1.4	3.7	61.4	Had breakfast after first blood taken.
	After	125	35	1.1	2.5	48.1	
2 Nephritic Preeclampsia	11-16-26	77	40	1.5	4.4		Breakfast after first blood taken.
	12- 4-26	79	51	1.5	4.6		
	12- 8-26 Before MgSO_4	89	33	1.2	3.2	63.3	
	After	92	30	1.1	2.5	62.4	
3 Preeclampsia True	12-10-26 Before MgSO_4	90	27	1.1	3.0	48.1	
	After	80	27	1.1	2.6	48.1	
	12-11-26 Before MgSO_4	69	22	1.3	3.5	46.2	Fasting.
	After	75	22	1.3	3.2	46.2	
	12-13-26 Before MgSO_4	79	30	1.5	3.0	42.4	Fasting.
	After	80	30	1.5	2.9	42.4	

The first case charted in the table, was the Case 1 above. The reading of Dec. 26, 1925 was taken on her admission in her first pregnancy, in an eclamptic state; the reading of Jan. 7, 1926, eleven days after she recovered from her eclampsia but while still undelivered and quite toxic. These readings were without relation to ingestion of food. The only treatment she had received, other than regulation of diet and bowels, was four injections of 20 c.c. of 10 per cent MgSO_4 . While these readings do not show the immediate effects on the blood chemistry of the magnesium sulphate, yet we find associated with a marked clinical improvement,

an actual decrease of the blood sugar from 166 to 100 mg. per 100 c.c. the N. P. N. remaining constant. A marked decrease in the preformed creatinin, a considerable decrease in the uric acid. Unfortunately there was no CO_2 combining power estimation in the first blood analysis. On her last admission in her second pregnancy at term, with a blood pressure, 200/120, usual urinary changes, but not in an eclamptic condition, she received an injection of MgSO_4 on Dec. 5, 1926 and two injections on Dec. 6, 1926, her blood pressure falling to 154/106 on Dec. 7, 1926; on which day her blood chemistry taken without regard to her food intake was sugar 90, N. P. N. 27. Preformed creatinin 1.2, uric acid 4.0, CO_2 combining power, 45.3 vol. per cent. On Dec. 8, 1926, we attempted to get a "before and after" MgSO_4 blood reading, while she was fasting, but a nurse by mistake gave the patient her breakfast after the first blood was taken. The chart shows a considerable increase in the blood sugar, 56 mg. per 100 c.c., due to food, and a decrease in CO_2 combining power.

The second case whose blood chemistry values are charted, is the second case above reported, also a nephritic preeclamptic. The first two readings were without relation to food intake or to MgSO_4 injection although she had had thirteen injections in the eighteen days interval between the two readings. There was no improvement in her condition, so her pregnancy was terminated. There was no appreciable change in the sugar; the N. P. N. increased markedly. A "before and after MgSO_4 " reading four days after delivery, showed no appreciable change.

The third case charted, a preeclamptic of the true eclamptic type, whose clinical record is not here reported, had a series of three "before and after MgSO_4 " readings. Here too, as can be seen from the table the variations were negligible, entirely within the range of technical error. The CO_2 combining power showed absolutely no change "before and after" although there was a decrease from 48.1 to 42.4 vol. per cent in the course of the three days of observation. As her toxemia showed no improvement, although eclampsia did not develop, her pregnancy was terminated. Whether the slight drop in the CO_2 combining power was entirely due to her persistent and possibly increasing toxemia, or was partly caused by the MgSO_4 injections is a question which cannot now be determined. Dr. Maner, the hospital pathologist, to whom I am indebted for the chemical blood analyses, is now undertaking an investigation as to effects of therapeutic doses of MgSO_4 on the blood chemistry, on a series of toxic cases, controlled by blood examinations of toxic cases not so treated.

The results here reported would tend to show that the intravenous use of therapeutic doses of MgSO_4 does not have any immediate bad effects on the blood, while its continued use in the one eclamptic (nephritic type) showed a marked reduction in the blood sugar, creatinin and uric acid coincident with the clearing of the active eclamptic condition.

There have been too few readings to draw any final conclusions as to the effects on the blood chemistry; but taken in conjunction with the clinical results which have now been reported, amounting to approximately two hundred cases (intravenous and intramuscular use) in which the number of injections must closely approximate one thousand, would point toward the conclusion that the use of MgSO_4 is not only warranted but indicated.

The pathologic changes, as a result of MgSO_4 injections, Stander found to be "marked fatty changes in the liver and numerous dilated

capillaries and many spaces filled with blood. There were no, or only slight, changes in the kidneys." These changes are, admittedly, not similar to those found in eclampsia, but if such an effect on the liver were produced by therapeutic dosage, it would, because of added damage to an already injured organ, certainly speak against this use of magnesium sulphate. I had thought that it would not be possible to meet this objection, as we have had no fatal case for several months. A case seen by me in consultation, with Dr. H. L. Davis, Huntington Park, recently, one of acute fulminating eclampsia, has furnished some evidence of the effects on the tissues of intravenous MgSO_4 in therapeutic dosage. The clinical record of the case is appended to this paper (Case 4).

CASE 4.—This was an acute fulminating case of intrapartal eclampsia, which was delivered spontaneously of a living child five hours after her first convulsion. When I first saw the patient at 11:45 A.M. she had had two convulsions (the last

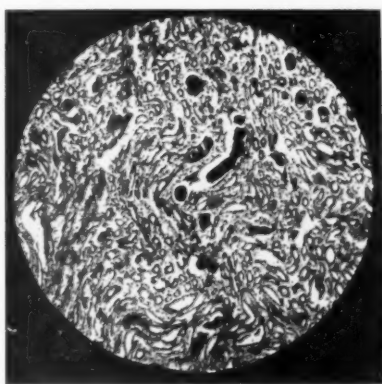


Fig. 1.—Kidney in case of acute fulminating eclampsia, acute tubular necrosis, tubules choked with blood and albuminous material. (x80.)

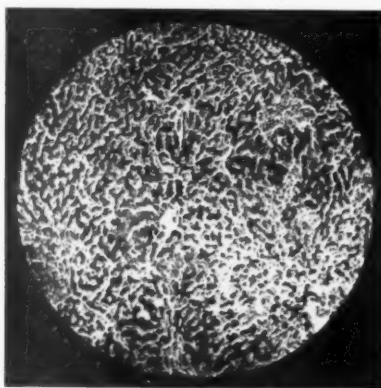


Fig. 2.—Section of liver from acute fulminating eclampsia, showing small area of normal liver, upper right; large areas of necrosis in some of which periportal origin is evident. (x80.)

one at 9:45 A.M.), was still comatose and at the termination of the second stage of labor, the caput appearing in the vulva with the pains. Delivery was rapidly completed under gas anesthesia by fundal pressure. She had had two injections of MgSO_4 . She had another convulsion at 3:45 P.M. and one at 12:15 A.M., Nov. 20, 1926 and the MgSO_4 was repeated after each one of these convulsions. She had no more convulsions for forty hours until Nov. 21, 4:25 P.M., when the attack was apparently precipitated by an intravenous injection of caffein sodium benzoate which was given in the hope of stimulating the patient who was very low and also in an attempt to increase the kidney action. The last convulsion at 10 P.M. (Nov. 21) also followed immediately upon another intravenous injection of caffein sodium benzoate. The urinary output was extremely scant there being only six ounces of bloody urine obtained between 7 A.M. and 9 P.M. (Nov. 19); a dry catheterization at 2 A.M. and 6 A.M., to be followed by three drams at 10:30 A.M., four drams at 4:30 P.M., one ounce at 10:30 P.M. (Nov. 20, 1926), and one ounce at 2 A.M., two and a half drams at 6:30 A.M.; three drams at 11:30 A.M., three drams

at 4:40 P.M. and one dram at 9:30 P.M. (Nov. 21), and no more up to the time of her death, a total of ten ounces of bloody urine in the seventy-two hours elapsing between her first convulsion and her death. (Bladder empty at autopsy.)

The clinical observations are explained by the autopsy findings. Both kidneys presented a very extensive acute hemorrhagic nephritis, the tubules being fairly choked with albuminous material and blood cells, as can be seen in Fig. 1. The liver showed an extensive hemorrhagic necrosis, a few fields showing it to be definitely periportal, typical of eclampsia; but in most fields the necrosis is so diffuse that its origin cannot be determined. Dr. Zeiler's explanation is that the entire lesion was an eclamptic one, but the liver injury was so overwhelming that it spread throughout the liver substance. (Fig. 2.) This opinion is concurred in by Drs. Walter Brem and Roy Hammock, Dr. Zeiler's associates, who kindly looked over the slides for us. Dr. Zeiler also made a special fat stain to see if this patient, who had received seven injections of 20 c.c. each $MgSO_4$, presented fat deposits in the liver such as described by Stander as having been found in his dogs. Fig. 3 shows no fat globules in the liver.

The brain is interesting for in the presence of an almost complete anuria with extensive and practically total destruction of kidneys and liver, it was relatively dry. The patient's surface edema showed no diminution but rather slightly in-

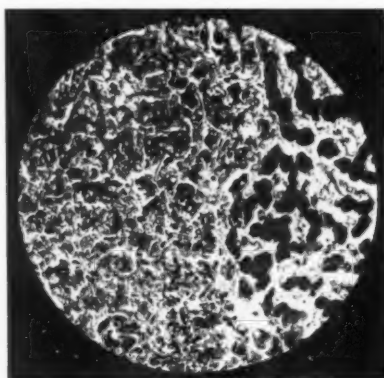


Fig. 3.—Section from same liver (Sudan III stain) shows relatively normal liver cells on right; diffuse necrosis to left; an occasional vacuole but no definite fat droplets. (x300.)

creased up to time of her death. This apparent lack of dehydrating effects of the $MgSO_4$ can be explained, I believe, in view of the autopsy findings, by the assumption that the dehydrating effects of $MgSO_4$ are exerted first on the brain, and as there was no outlet through the kidneys, which were blocked, the surface edema remained uninfluenced. On the afternoon of Nov. 21, 1926, we considered the advisability of resorting to decapsulation by Edebohls' method but decided against it. The kidney findings show I believe, that this or any other therapy would have been unavailing. This, then, is one of the fortunately very rare cases of acute fulminating eclampsia which so overwhelm the patient that no present known therapy is of avail.

In the face of the clinical results which we have obtained and heretofore reported, and which others have duplicated, we are told that our practice "seems dubious" and that "the use of magnesium sulphate to control the convulsions is not warranted" because two dogs which had been given overdoses "had marked fatty changes in the

liver" and there was observed "a lowering of the CO_2 combining power and a slight increase in the blood sugar." It is unfortunate that this simple procedure which has shown such encouraging clinical results should be discouraged on the basis of such scant evidence.

The study here presented was undertaken in the hope of learning if the same changes which take place in the dog from toxic doses take place in the woman where therapeutic doses have been used.

CONCLUSIONS

1. Chemical and pathologic findings indicate that in therapeutic doses, magnesium sulphate intravenously does not exert any deleterious action on the blood, nor produce any pathologic changes in the liver, but on the contrary in the active eclamptic, by a relief of the toxemia, has a beneficial effect on the blood. The one pathologic report here made demonstrates the dehydrating effect in the brain.

2. Further clinical experience with intravenous magnesium sulphate has but increased my confidence in its efficiency.

3. The experience of the past two and a half years of its use in the preeclamptic has demonstrated its value as a prophylactic measure in these cases. This does not mean that all cases can be carried to term without eclampsia supervening. There are many cases where pregnancy has to be terminated, especially those of the nephritic type, as is illustrated by many of the cases which we have heretofore reported.

4. No claim has ever been made that this treatment is in any sense a specific nor that with it one can expect 100 per cent success. But I do believe that, with a careful observation of cases and with the aid of MgSO_4 intravenously, the incidence of eclampsia can be further reduced and the mortality of eclampsia should be less than 10 per cent, and with the further development of this therapy a mortality of less than 5 per cent is not too much to expect.

I am indebted to Dr. G. A. Maner, pathologist of the Los Angeles General Hospital for the blood analyses and to Dr. A. H. Zeller for the autopsy and pathologic report as well as for the microphotographs.

2007 WILTSHIRE BOULEVARD.

THE TREATMENT OF OBSTRUCTING RECTOVAGINAL ENDOMETRIOSIS

BY WILLIAM P. GRAVES, M.D., BOSTON, MASS.

AT a meeting of the American Gynecological Society held in May, 1925, I reported a case of obstructing rectovaginal endometriosis¹ successfully treated by hysterectomy and by removal of the ovaries combined with a temporary colostomy. The patient, moribund at the time of the operation on account of gradual and finally complete obstruction of the bowel, recovered from the operation and eventually regained normal function of the rectum as a result of atrophy and resorption of the pelvic mass. On the basis of the results in this case I recommended hysterectomy and ablation of the ovaries in the treatment of obstructing rectovaginal endometriosis in preference to the radical operation formerly advocated by Dr. Cullen. This method of treatment has not met with entire approval on the part of some writers whose criticism appears to be based on theoretic grounds rather than on those of actual experience.

In order to substantiate the statements and recommendations made in the earlier paper two other similarly treated cases are herewith presented, one from my practice and one from that of Dr. John A. Sampson, who has kindly contributed his notes for inclusion in this report. The original case is repeated in detail with the special purpose of reporting the present condition of the patient two years and a half after the operation and is as follows:

CASE 1.—The patient, a single woman of forty, in apparently good health, consulted me in October, 1923, for rectal pain at the time of her menses. Four years previously she had been examined by a prominent general surgeon, and by a rectal specialist, both of whom had made a diagnosis of inoperable cancer of the rectum. Since then she had continued her work as a private secretary and had suffered no especial impairment of health. My examination revealed a large abdominal tumor reaching above the umbilicus. There was an extensive induration of the pelvis which caused a nonulcerated stricture of the rectum through which the finger could be passed with difficulty. I also diagnosed the case as probable cancer combined with a uterine or ovarian tumor, though I was puzzled by the excellence of the patient's physical condition. On account of the doubtful diagnosis, an exploratory laparotomy was advised, and arranged for, but the patient did not appear. Nine months later, July, 1924, she again consulted me, this time for obstruction of the bowels. She was greatly changed in appearance, much emaciated, and enormously distended. The abdominal tumor had markedly increased in size, and the stricture of the rectum was nearly complete. She was taken immediately to the hospital where the distention of the bowels was relieved with great difficulty.

¹Graves' Relationship of Ectopic Adenomyomas to Ovarian Function, AM. JOUR. OBST. AND GYNEC., November, 1925, x, No. 5.

Under anesthesia the abdominal tumor was definitely made out to be a fibroid. The induration of the pelvis hopelessly involved the rectum, cervix, and upper vagina. A specimen was removed from an ulcerated area of the vaginal fornix, which on microscopic examination proved to be typical endometrial tissue. With the diagnosis thus made the aspect of the case was instantly changed. Although the patient was in extremis, the abdomen was opened a few days later, and a rapid supravaginal hysterectomy was performed with a removal of both ovaries. In one ovary there was a small nonadherent chocolate cyst. The colon, now completely obstructed, was colossal in size. A pucker of the gut wall was drawn up through and fastened into a stab wound through the left rectus muscle, and a glass Mixer tube placed in the bowel. The patient survived the operation and immediately began to improve in health as a result of the relief derived from the colostomy. For weeks the expected regression of the pelvic mass was watched for in vain. Finally, in about five months a perceptible softening and diminution in the size of the mass appeared, and the patient began to have partial movements through the natural channel. Improvement then became more rapid. The colostomy opening was allowed to close seven months after the operation, and the patient was discharged in excellent health on February 22, 1925.

When seen on April 15, 1925, she was in perfect health, having regained her normal weight and strength. She was having normal movements of the bowels with the help of a single daily dose of mineral oil. Examination still showed some thickening and induration in the paracervical and pararectal tissue, but there was marked diminution in its extent and hardness.

When last seen, January 25, 1927, the patient stated that she was in perfect health and that for many months her bowels had been moving daily without cathartics. Examination showed some atrophied nodular relics of the former tumor mass that filled the pelvis. The cervix was no longer involved and was movable. There was still a partial stricture of the rectum, but the lumen was sufficiently patulous to give no trouble.

CASE 2.—Mrs. R. First seen August 16, 1926. The patient was thirty-eight years old, had been married twelve years, and had had a child born dead, one year after marriage. At her delivery she had received a tear through the sphincter ani muscle which was later successfully operated upon.

For two or three years she had noticed a small amount of bleeding between her periods. Of late there appeared to be some obstruction to defecation which she ascribed to the results of her former sphincter operation. This was particularly noticeable during the catamenia.

At the time of consultation there was almost complete obstipation, the patient having been unable to move her bowels for several days previous. Diagnosis of the attending physician was cancer of the rectum. The patient's general appearance was that of robust health. Pelvic examination revealed an ulcerated area in the posterior vaginal fornix which bled easily. The lower pelvis was filled with a hard infiltrating mass that immobilized the cervix and involved the rectum. The lumen of the rectum at about three inches from the anus was constricted by the mass to a size that would just admit the tip of the forefinger. There was no ulceration of the rectal mucous membrane. A diagnosis of rectovaginal endometriosis was made, and the patient anesthetized for proof by biopsy. Tissue removed from a deep incision in the posterior fornix directly into the mass revealed typical endometrial glands. The stricture of the rectum was dilated with long pliable rectal bougies. The situation was explained to the patient and consent granted for a hysterectomy with a possible colostomy. The stretching of the rectal

stricture relieved the patient's obstipation to such an extent that she did not report for operation until two weeks later. The operation performed on September 4, 1926, consisted of a supravaginal hysterectomy with removal of the adnexa. There were many dense adhesions in the posterior culdesac, but no chocolate cysts or other endometriomas were found. No attempt was made to extirpate the dense board-like mass surrounding the rectum and infiltrating the deep cellular tissue of the pelvis. As the stretching of the rectal stricture had given the patient immediate relief it was decided that a colostomy was unnecessary. The recovery was uneventful, the bowels moving readily with catharsis. The patient reported for examination on December 13, 1926. She was in excellent health, the bowels being regulated by mild cathartics. Examination showed the mass in the pelvis to be reduced about one-half. There was still some stricture of the rectum, but the deep constricting ring of tissue was softer and the lumen considerably larger. The pelvic mass is behaving in this case exactly as it did in the first case, and if it continues to do so, it will undergo further marked diminution in the next six months.

CASE 3.—I am greatly indebted to Dr. Sampson for the report of the following case. It is of especial interest since the treatment adopted was based on the results of Case 1 recorded above. The report is transcribed verbatim from Dr. Sampson's personal letter:

"November 12, 1926. I saw Mrs. A. P., aged forty-one first in March in this year. She had one child in 1912 and a miscarriage in 1917. Menstruation was regular, without much pain, and a moderate flow. The last flow occurred four weeks before I saw her.

"Her chief complaint was marked constipation at the close of the menstrual period. She stated that it began in January of this year and was increasing in severity. She told me it took from 7 to 10 days to recover from this constipation. There was no marked pain associated with it, but her abdomen became greatly distended.

"On examination I found marked induration of the culdesac, extending down the rectovaginal septum. On rectal examination this induration could also be definitely determined. There was no difficulty in making a diagnosis of the condition present.

"She was operated upon on March 9, the second day of her menstrual period. At the time of the operation the entire anterior culdesac was found to be obliterated by the fusion of the uterus to the bladder, due to peritoneal endometriosis in that situation. Both tubes and ovaries were apparently normal, and there was marked invasion of the culdesac fusing the sigmoid to the posterior surface of the cervix. The sigmoid was greatly distended to two or three times its normal size. I removed the appendix, both tubes and ovaries, and the entire uterus and portion of the vagina and made a temporary colostomy by bringing up the loop of the sigmoid to the anterior abdominal wall on the right side through a split muscle incision. A rubber tube was inserted in the large intestine. She had as a post-operative complication a bronchopneumonia which I think might have been due to dissemination of endometrial tissue into the lungs. She recovered from this and left the hospital with her bowel evacuations moving both through the colostomy wound and also through the rectum.

"I saw her on May 14 and the colostomy wound was nearly closed and her bowels were moving practically entirely through the natural channels. She was seen again in July and the colostomy wound was entirely closed. At the time of both examinations there was still marked induration in the anterior rectal wall and also on either side of the rectosigmoid. I saw her for the last time today. She feels well, has gained in weight, the bowels move naturally, but the induration in the

culdesac still persists but has not increased in amount. Symptomatically she is free from any trouble. A very interesting feature of the histologic study of the specimen removed was that a good bit of the endometrial tissue was of definitely metastatic origin as shown by serial sections of these areas."

CONCLUSIONS

1. Since endometriomas of all kinds reproduce both histologically and physiologically the uterine mucosa, it is reasonable to suppose that unless it has undergone malignant change the tumor tissue like that of the normal mucosa should become atrophied after cessation of ovarian activity. I have noted this behavior in cases where discrete palpable endometrial tumors had been left in the posterior culdesac after supravaginal hysterectomy.

2. The method of treatment suggested by these three cases is simple of execution and safe for the patient as compared with the formidable operation required in extirpating the growth.

3. Temporary colostomy should be employed in severely obstructed cases until the constricting mass about the rectum is sufficiently atrophied or resorbed to permit of the normal function of the bowel. A colostomy performed after the manner described in Case 1 will close spontaneously in a few days after removal of the glass drainage tube.

4. The indurated mass in the pelvis does not entirely disappear, but diminishes greatly in size, and gives no symptoms.

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Doerfler, H.: Spurious Pregnancy. *Monatsschrift für Geburtshilfe und Gynäkologie*, 1925, lxxviii, 290.

On the basis of four cases observed by him and the 133 cases reported in literature the author believes in Nassauer's definition, that spurious pregnancy implies a condition in which a woman believes herself pregnant, feels life and maintains that the child is growing although she is not pregnant. The author believes that the cause of pseudocyesis is hysteria. On this assumption may be explained the morning vomiting, amenorrhea, and the supposed enlargement of the breasts. The abdominal enlargement may be due to aerophagy, variation in tonicity of the diaphragm and abdominal muscles, and flatulence. The increase in weight may be due to the increased rest and intake of food to which the patient resorts when she believes herself to be pregnant.

From the legal standpoint, pseudocyesis is important because of the possible charges of murder of the newborn, criminal abortion, or substitution of another child.

J. P. GREENHILL.

THE EMOTIONAL LIFE OF WOMAN IN RELATION TO THE PRACTICE OF GYNECOLOGY*

BY DONALD MACOMBER, M.D., BOSTON, MASS.

THIS subject demonstrates the extraordinarily close connection between mental states and the function of various organs. The connection has, of course, always been recognized. It is one of particular importance in relation to the pelvic organs partaking, as they do, in such an intimate manner in the emotional life of the individual. Since the symptoms which arise from disordered function of these organs are the same, whether the cause is of local, constitutional or emotional origin, it is imperative to be able to recognize the cases where they do not come from definite pathology. It is easy to feel that certain symptoms are always associated with certain diseased conditions, but often disastrous from the point of view of the patient who fails to get relief from operative or other forms of treatment directed solely to the removal of purely local conditions.

I propose, then, to discuss this important subject in a quite informal manner, illustrating some of the points by cases from actual practice. But before beginning this discussion, it is necessary to define what I mean by emotional states, and to review briefly the mechanism by which they produce the local symptoms to which I have referred.

There is no question but that sudden strong emotions such as extreme fear or anger may have visible effects upon the reproductive organs of the woman. This is, of course, obvious with sex emotion. These effects, however, are fleeting and, if the emotions are not constantly repeated, have no permanent effect. It is the more chronic emotions, if I may be permitted to use this term, which because of their very nature do produce sufficient effect to cause the development of actual symptoms. A chronic state of fear, grief or worry is often enough in the susceptible individual to produce such marked effects that they are often mistaken for actual disease. Other mental states which are less commonly regarded as harmful may also produce changes. Unhappiness, particularly if it be marital unhappiness, is a common cause of trouble, and I believe that in certain women there is a kind of mental tension which is often responsible for the development of some of these conditions. The symptoms which are produced may be of extraordinary variety. They include all of the more common ones so well known to the gynecologist, such as menorrhagia, dysmenorrhea, amenorrhea, bearing down and dragging sensations, backache, fatigue, leucorrhea and urinary frequency. Other

*Read at a meeting of the Brooklyn Gynecological Society, December 3, 1926.

systems besides the pelvic organs may be involved in the symptom-complex, and there may be headache, insomnia, indigestion, even nausea and vomiting, rapid heart beat or constipation. The state of nutrition may be affected and there is loss of weight, or a failure to be able to gain weight up to what should be normal for the individual height and age. As I have said, these symptoms are not accompanied by the evidence of actual pelvic disease, but there may be signs which to the critical eye will suggest that the origin is to be sought elsewhere than in the pelvis itself. Locally the most frequent sign is that of chronic passive congestion,—redness of the cervix, profuse though otherwise normal cervical secretion (a condition interpreted by the patient as leucorrhœa), fullness about the uterus which often approaches the softening seen with early pregnancy, and ovarian tenderness where the evidence of disease is lacking. It is not uncommon to feel actively pulsating vessels. In general, however, the thing that should make the practitioner suspicious that he is dealing with a functional derangement of emotional origin, rather than with a case of organic disease, is the contrast between the number of symptoms of which the patient is complaining and the absence of any signs of pelvic disease.

There is a dearth of accurate knowledge of the manner in which these symptoms are caused by the emotions which precede them. We know, of course, that the sympathetic nervous system which innervates the pelvic organs is in some vital manner concerned with the emotional life. You are all familiar with the James-Lange theory of the emotions, that we feel certain emotions because certain changes have been produced in the organs; for instance, we feel fear because our faces are pale, our pupils are dilated, our mouths are dry, our skin is covered with cold perspiration and our hearts are beating rapidly. Be this as it may, it is a fact that emotional states are intimately bound up with changes of a functional nature in various internal organs. These changes are produced through the sympathetic nervous system. They are changes in function which are ordinarily not under the control of the will. Every organ in which smooth muscle or gland tissue plays a part, including all the blood vessels and all the organs which have a secretion, whether external or internal, are supplied with fibers from the sympathetic nervous system. Emotional states may, therefore, cause symptoms in any of these organs. The common pelvic symptoms are caused by changes in the circulation which produce a chronic passive congestion. It is not unlikely that most of the disturbances of menstruation and ovulation which do not have a definite pathologic origin are of this nature and arise from this congestion. There is, however, another way in which emotions produce their effect upon the pelvic organs, namely, through disturbances in the production of the various hormones. It is well known

that there is a close interaction between the thyroid, pituitary and ovarian secretions. It is extremely probable that the adrenals and all the other glands having an internal secretion also partake in this interaction. If for some reason which we do not understand an emotional state produces certain effects upon one of these secretions it is apt to throw the balance of the others out of adjustment and produce symptoms. A case in point is the occurrence of hot flashes after removal of the ovaries. These symptoms are circulatory in origin and are called forth because the ovarian hormone no longer balances the internal secretions of the other glands. Patients universally state that hot flashes are more frequent if they are worried, fatigued or otherwise emotional.

Having thus taken a preliminary survey of the field let us now turn to a discussion of some of the actual instances in which emotional states have been known to cause symptoms of a gynecologic nature. Instances of this sort are undoubtedly well known. Many of them are described in textbooks on gynecology, but for some reason or other none of the authorities have collected their cases in such a way as to be an adequate presentation of the subject. The present paper makes no claim to any such purpose, the aim is merely a suggestive one in recalling to your minds how important the subject may be. No case should ever be questioned or examined without having in mind the possibility that any, or all, of the symptoms may have an emotional background. For convenience the subject is treated purely from a symptomatic point of view, and the presenting symptom is taken as a means of classification. Many cases fall under several headings, but in general there is one symptom which will dominate all the others, and it is usually this one which causes the patient to consult the physician. A word of caution is necessary at this point, however. Sometimes a false modesty, or a feeling of shame, will prevent the patient from revealing the true state of affairs at the first visit. This is particularly true if the trouble is something like masturbation or failure of coitus.

In general the symptoms fall under three headings, namely, those which indicate a disturbance of menstruation, those which have to do in some way with the relation between the sexes, and those which appear during the course of pregnancy, and it will perhaps be just as well to take them up in that order.

First, then, those symptoms which have to do with menstruation. Perhaps the most common is that of dysmenorrhea. That symptom may often have a background of displacement, anteversion or tumor. The vast majority of cases, however, do not show any marked pathologic lesions. Close questioning will usually reveal the fact that when the periods first appeared they were painless, and that the dysmenorrhea was a matter of gradual onset. Most such cases will also give a

history of mental or nervous overwork in the critical days when the habit of normal menstruation should have been formed. Perhaps the chronic state to which I have referred as a mental and nervous tension is more than anything else responsible. That this may be so is shown by the fact that cases are known to develop as a result of marital unhappiness.

A typical case (5041) is that of a seventeen-year-old high school girl whose periods began three years ago, always somewhat painful, but getting progressively worse during last year, so much so that morphine had been employed. Social history showed that she had been working hard preparing for college, had been also very active socially and had been taking part in dramatic plays. It was the severity of the period which had forced the parents to secure medical advice. Patient was seen in collapse resulting from severe pain caused by emotional strain of appearing in a play the previous night at beginning of catamenia.

To illustrate dysmenorrhea arising from marital unhappiness let me quote the case (5580), of another woman of thirty-one years of age who consulted me for sterility after six years of marriage. She had always had a little dysmenorrhea but nothing of any great amount until after her marriage. Since that time the pain had become steadily worse in spite of three operations. The examination was completely normal, and it was only after cross-examination that it was discovered that the appearance of every monthly period meant an emotional crisis, partly caused by marital unhappiness and partly the result of the failure to become pregnant.

Menorrhagia is a gynecologic symptom which may also be produced by emotional conditions. This is well illustrated by the case (5692) of a thirteen-year-old school girl, complaining of extreme menorrhagia, so much so that she sometimes only had seven to ten days in the month during which she was free from flowing. Examination was entirely negative, and the trouble seemed to be entirely a social one. Her mother stated that in addition to carrying on the work of junior high school last year, which kept her busy from rising in the morning until after three in the afternoon with no adequate noon meal and which required two or more hours' study in the evening, she was taking elocution, dancing and piano lessons and going to numerous evening parties.

Another case (5262) is that of a twenty-five-year-old single woman who came in complaining of pruritus, menorrhagia, leucorrhea and nervousness. Pelvic examination showed nothing but congestion. The real trouble proved to be masturbation, and there was complete relief with depletion and advice.

This particular symptom of menorrhagia is practically always associated with pelvic congestion, but the congestion may result in different ways. This is shown by (5476) the case of a woman of thirty-seven, married sixteen years, with four children, complaining of leucorrhea, dyspareunia, menorrhagia, etc. Her trouble began with the six months' illness of her husband and had been continued by the fear of pregnancy. She experienced much relief from depletion and advice in regard to birth control.

Another patient (5126) was a married woman of thirty-eight, with three children. She came in because of menorrhagia and intermenstrual bleeding. The examination was negative except for congestion. There was nothing in her history to suggest a cause except a state of chronic fatigue from constantly living beyond her strength. As soon as she lived a more normal life and after depletion her symptoms straightened out.

Irregular or scanty menstruation amounting even to complete amenorrhea is well known as the result of grief, or homesickness. Many young girls are subject to amenorrhea when they first go away

to school, apparently from the latter reason. A change into strange surroundings will often produce this result. Note the effect of coming into this country often seen with green immigrant girls. The fear of pregnancy will sometimes cause an amenorrhea which will simulate pregnancy in every way.

A case in point is that of (3282) a married woman of forty-two with two children, who came in having skipped two periods much afraid she was pregnant. Examination showed nothing but congestion. When the patient was assured she was not pregnant, her period came on within a few days and her symptoms disappeared.

A similar case (4780) is that of a married woman of forty-five, with two children, who having gone over ten days presented all the symptoms of pregnancy. She was extremely nervous and apprehensive, but when told that she was almost certainly not pregnant, menstruation started that night and her symptoms disappeared.

These are not isolated instances and are probably extremely common with a certain type of woman early in the changes at the time of the menopause. Usually, however, the fear of pregnancy does not result in amenorrhea, but in pelvic congestion alone. This type of case is very common and often appears where the economic factor makes further pregnancies a matter of dread.

Such a case is that of (5523) a married woman of thirty-five with four children on a professor's income, who to avoid further pregnancies attempted to practice continence, or whose husband practiced withdrawal. Intense pelvic congestion resulted together with various referred symptoms. Advice as to a more physiologic method of preventing conception gave her complete relief.

Occasionally amenorrhea occurs in young people of an intensely emotional character and there is subsequently found to be a disturbance of an endocrine nature. It is hard to say which of these conditions arises first; the chances are that they both are caused by a previous emotional unbalance in cases of this particular sort. I do not mean, of course, to imply, for instance, that all cases of low thyroid and scanty or absent menstruation are of purely emotional origin.

Cases of this sort are illustrated by (5508) a young girl eighteen years of age who had never had periods. While there were certain things which were not quite normal, such as slight anemia and poor nutrition with low blood pressure, the chief cause seemed to be intense mental and nervous activity due to competition in studies both before and during college. Her periods appeared before the physical conditions had been corrected merely after a change in schedule. This patient also apparently had a pituitary disturbance, but it is felt that that condition had probably arisen secondarily to the emotional strain under which the patient was living.

Another case of amenorrhea with emotional and later endocrine background is that of (5619) a married woman of thirty-three, married eight and a half years, complaining of sterility and periods of amenorrhea. This patient began menstruating at fourteen, was normal for six months, after which she was sent abroad for a year, during which time there were no periods. Periods were normal until she became engaged at the age of seventeen. During this time there was much sexual excitement and a good deal of unhappiness. The periods became very irregular, the engagement was terminated at twenty. At the age of twenty-three after a severe emotional crisis, she developed menorrhagia and metrorrhagia. She was married in

1917 and her husband was taken prisoner during the war. For the past year she has had further trouble of an emotional nature with another man. Recently her periods have only come once or twice a year and her metabolism is minus 17. After taking thyroid extract periods are now coming every six weeks.

Leucorrhea is a very common result of emotional states. It develops from the oversecretion of perfectly normal organs (I am speaking of cases in which there is no pathology). This symptom is often associated with others and always means an accompanying congestion. It may be due to various causes among which may be noted masturbation, long engagements with overstimulation, or emotional crises. Practically all cases which show pelvic congestion also complain of leucorrhea. In most cases leucorrhea is not, however, the presenting symptom. When this is the case, I think there is apt to be a presumption in the mind of the gynecologist that he is dealing with an inflammatory condition, whereas quite the reverse may be the fact. Examination of the cervical secretion will make the diagnosis easy and will often serve to call attention to the functional nature of the case. When the leucorrhea is of inflammatory origin, the secretion is thickened, opaque and mucopurulent, but when it is due to pelvic congestion alone the secretion is usually quite clear and noninfected.

For instance, an unmarried girl of twenty-three (5366) came in complaining of a most extreme and annoying leucorrhea of such severity as to cause chafing and pruritus. There was also a good deal of pelvic pain and backache. A curettage relieved for a time but did not effect a cure. It was then discovered that the real cause was worry about an engagement which members of her fiancé's family were trying to break off. Her symptoms were not cured entirely until after she was married.

A second case (5082) is that of a woman of twenty-eight, married five years, who complained of sterility and leucorrhea. There was trouble with the ovaries but operation brought no relief until the emotional background had been discovered and treated. This patient was raped by a friend of her father's about the age of sixteen, and there is little question but that the emotional disturbance which persisted into married life was responsible for the sterility and the pelvic congestion. After a lapse of four years and intensive treatment along psychologic lines, the patient is now normally pregnant.

The second large group consists of those cases in which the symptoms arise from some difficulty with the relation between the sexes. The first cases are those in which coitus fails altogether as the result of impotence on the part of the husband. In those cases if the wife is at all passionate, symptoms may be very marked and there is likely to be intense pelvic congestion.

This is illustrated by the two cases following; the first (5505), a woman of twenty-six, married five and a half years, without children. She complained of leucorrhea and other symptoms of pelvic congestion. There was much disturbance of the periods which had become very scanty. The real trouble turned out to be impotence on the part of the husband. The other (5221) was a woman of thirty-four, married seven years, without children. Complaining of menorrhagia and abdominal pain. The real trouble in her case also was complete impotence on the part of the

husband. Both these cases were relieved by depletion. Treatment with them had to be directed toward relief of the congestion alone, as it was impossible to do anything for the impotence. In other cases, however, the impotence does prove amenable to treatment. The treatment usually is entirely psychologic and consists in unravelling the complicated emotional and social factors which have been responsible for the development of the condition. In cases of this sort, just as when dealing with cases of vaginismus, one must usually see and examine both husband and wife to bring about a cure.

To illustrate this point let me quote the case (5539) of a woman of twenty-nine, married five years, who had had one child three years previously. At the time of her examination she was in such an emotional state that she appeared to be in the depressed stage of a true manic-depressive insanity. It took some time to get at all the details, but eventually the following facts were ascertained. The husband was of a peculiar sensitive disposition. As a boy he had been an excessive masturbator and for some weeks after marriage he was impotent. At that time his wife had been sensible enough not to force the issue, and eventually coitus became normal. Though she was fond of her husband, her chief motive in marriage had been the desire for children. When she became pregnant she became cold toward her husband, and as a result he developed a feeling of jealousy toward the unborn child. This feeling grew to such an extent that he went off on a trip at the time the baby was to be born. The estrangement continued to increase. The wife had obtained what she wanted, and apparently felt little need for her husband. Then suddenly the year previous to the time of examination the baby died. In some way the wife blamed the husband's indifference for this tragedy and yet she now desired coitus in order to have more children. This attitude on her part brought back the impotence of the husband, and there had been no normal coitus for practically the whole year. An explanation of this causal sequence was sufficient to straighten matters out for both of them.

The causes of failure of coitus are many. Perhaps the most common is vaginismus. This may, or may not, be accompanied by a sort of relative impotence; on the other hand many cases which are thought to be impotence prove to be the result of some definite trouble on the part of the woman. Vaginismus is often caused by a tight hymen which does not easily rupture with intercourse. In some cases the hymen may remain unruptured for years; in fact, one of the most extraordinary features of this particular disturbance is the length of time which patients will allow to elapse, apparently because of a sort of false modesty, before seeking relief through medical advice.

An extreme case (4388) is that of a woman of thirty-four who was married ten years, without normal coitus. This was preceded by a four-year engagement. During the ten years of married life the patient developed an unusual number of symptoms, digestive, urinary, and pelvic. She also had a great deal of insomnia. She went from doctor to doctor vainly seeking relief, too diffident to disclose the true state of affairs. Her husband in the meantime gradually became relatively impotent as a result of a prostatic congestion. Both impotence and vaginismus were relieved when the psychologic mechanism by which they had been produced was explained.

Another unusual case (5548) is that of a woman of thirty-four, married seven years, without coitus. This couple also had been engaged for five years preceding marriage. When the details had finally been worked out it appeared that there was

trouble on both sides. During his adolescence the husband had discovered that he derived a peculiar sex satisfaction from stroking horses. He was naturally much ashamed of this and after marriage allowed his previous fears and anxieties to affect him in such a manner that he became impotent. His wife was naturally a rather passionate type and because of lack of satisfaction, she developed an extreme vaginismus. This case also was completely straightened out after the situation had been made clear.

It is interesting to note that in both of these cases the trouble was preceded by a long engagement. I feel that this may be a very potent cause of pelvic congestion in either sex and may cause all kinds of symptoms, to say nothing of subsequent sterility. The cause apparently is due to over sex stimulation without satisfaction. Cases of this sort might be multiplied almost without limit. I cannot help quoting one other, however, because of the extraordinary duration of the symptoms.

This (5675) was a woman of thirty-four, married eleven years, without children. She and her husband were engaged seven years, and when they married coitus proved to be impossible because of vaginismus and prostatic congestion. The trouble in this case was completely relieved one year ago, but as happens so often, the sterility has persisted, and the patient now has large cystic ovaries.

This leads me to say a few words about sterility as a symptom in cases of this sort. When functional disturbances are at all severe or of long standing, it is rare indeed to have pregnancy occur readily. Apparently the chief factor in disturbing "the mechanism of fertility" is chronic pelvic congestion. When this is relieved before too long a time has elapsed, either by depletion or correcting the emotional disturbance back of the congestion, there is usually a complete return to normal fertility, but when, as in the last case cited, the symptoms are of long duration, one is very apt to find changes in the organs themselves. Personally I believe there is a causal relationship between chronic passive congestion of long duration and a certain type of pelvic pathology. This is notably the case with the ovaries which are apt to become thoroughly cystic and cease to function as regards egg production. This has happened in the case noted above. It is the sort of case in which a functional cure of the emotional disturbance will not be sufficient to correct the sterility. The only chance for a relief of the sterility will be operative treatment of the ovarian condition.

There are many other symptoms which arise as a result of an abnormal unsatisfactory relation between the sexes. They vary enormously from indigestion, headache or insomnia to bearing down sensations, leucorrhea or backache. Symptoms may be called forth where coitus is complete but painful. In this instance the trouble seems to arise from a lack of satisfaction of the woman's sex instincts, although she may be totally unaware of any such desire. It is, however, the pain which forms the presenting symptom.

One rather unusual case (5517) was that of a woman of thirty-two who had been married three years and who had had one child soon after marriage. Because husband and wife were of different religions, friction amounting to extreme unhappiness developed over the church in which the child was to be brought up. The husband refused to allow his wife to have a second pregnancy, and to avoid this, he practiced a method of birth control which he had learned from a friend. This method was so cumbersome as to remove all spontaneity from their relationship eventually leading to a kind of emotional impotence. This in turn, both because of the impotence and of the method employed, caused the development of dyspareunia and failure to satisfy the sex life of the woman.

Two other common abnormalities of coitus leading to the production of emotional disturbances and secondarily of pelvic congestion in the woman are excessive coitus and coitus which stimulates the woman but does not give her the normal relief of the orgasm. Cases of this sort are very frequent indeed and in fact might be said to be the rule in early marriage, where the woman has previously led a sheltered life and there has been no full arousing of her sex feelings. They are, of course, much more frequent when marriage occurs late in life. Usually the cure is spontaneous with the readjustment which takes place in the first year after marriage. There is, however, a type of ignorant or selfish husband who permits the condition to persist, and cases are all too commonly seen where the congestion has led to subsequent infection or permanently disturbed function.

For instance, there is the case (5034) of a woman of twenty-eight who had been married for fifteen months, during which time she had had intercourse two or more times daily. She came in complaining of metrorrhagia, frequency, and failure to have children. There was intense pelvic congestion. In this case it took two years of treatment, both office and operative, to relieve the symptoms and bring the organs into a condition in which conception was possible.

Occasionally the trouble arises from absence of intercourse where intercourse is anatomically possible. Abstinence may be voluntary, as in the case (5622) of a woman of thirty-four, married nine and a half years, who stated that she and her husband had remained completely continent for a year and a half after marriage as a method of birth control. There was, of course, constant sex stimulation, and a sufficient functional disturbance occurred to delay conception for two years after normal intercourse was practiced. After the birth of this child there was again a period of continence lasting fourteen months. That patient consulted me because she had been unable to have a second pregnancy although she had been trying for four years. She complained of frequent backache and much leucorrhea.

In other instances peculiar psychic states in one married partner may lead to an aversion to intercourse sufficient to inhibit it altogether. If the other partner retains normal sex desire, there may develop all sorts of secondary symptoms, particularly if it is the woman.

The last group is one of symptoms which may develop from emotional states in pregnancy. It is, for instance, not infrequent to have abortion brought on as a result of extreme emotion. Lesser emotions will often cause flowing.

This is well illustrated by the case (5082) of a woman of thirty-three, married nearly ten years without children. She was of an intensely emotional temperament and her case has been referred to previously in another respect. After long treatment she became pregnant and is now some four and a half or five months along. After she was seen a month ago, at which time a positive diagnosis of pregnancy was made, there was such intense excitement that on returning home she had a copious blood-stained serous discharge soaking through two or three pads. It looked as though the membranes had ruptured, but the pregnancy is going on normally at this time, and it is now obvious that the flow came merely from a tremendous overactivity of the cervical glands.

There is one case on record in which listening to music during pregnancy would produce such congestion as to cause a profuse leucorrhoeal flow and eventually abortion until this cause had been recognized and removed. It is also, of course, well recognized that many of the extreme cases of the nausea and vomiting of pregnancy, which at first sight seem to be pernicious in character, are in reality due to some difficult social or marital condition at home.

Cases of this sort are so frequent that the first principle of the treatment of the excessive vomiting of pregnancy is the isolation of the patient from all outside influences. They fall, however, more under the jurisdiction of the obstetrician than under that of the gynecologist, and for this reason I shall not take up more of your time in discussing emotional disturbances in pregnancy.

I feel that this has been a very inadequate presentation of a very important and much neglected phase of the practice of gynecology. As I stated in the beginning of the paper, my presentation is intended merely to be suggestive in character, and not in any sense to be an exhaustive one. In concluding, I wish to emphasize several points which seem to me important. In the first place the fact that a patient complains of a given symptom is not evidence that there is necessarily any disease present. A symptom merely means disturbed function. The pelvic organs may exhibit functional disturbances because of the presence of disease or mechanical abnormalities or their function may be altered by emotional states of the woman through their effect upon the circulatory or endocrine systems. I have presented some of the more common symptoms with the emotional states which have produced them. This would seem to be a field for cooperation between the gynecologist and the psychologist or internist. It is a field which none of us can afford to neglect. It must also always be borne in mind that, even when disease is present, symptoms may have another or at least a combined origin. In other words, in our search for pathology in the pelvis, we should never forget that primarily we must deal with the patient as a whole.

(For discussion, see p. 804.)

RESULTS OF OPERATIONS FOR RETROVERSION*

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IN THE following paper an effort is made primarily to analyze the end-results of 1,000 operations for retroversion of the uterus performed by a group of surgeons upon patients in the public wards of the Woman's Hospital, extending over a period of five and one-half years, from January 1, 1919, and covering, roughly, 9,000 admissions. Such a study, however, must take into account other aspects of retroversion than operative end-results alone and must consider to a certain extent anatomy, etiology, and symptomatology.

It is not to be understood that all our retroversions come to operation, for many patients, particularly the recently-delivered women who return to the postpartum clinic, undergo palliative treatment in the out-patient department.

In a large number of the patients in this series there were associated pathologic conditions of the pelvic organs which contributed to the symptoms for which relief was sought, and some probably would not have come to operation had there not been diseased adnexa, restricted mobility of the corpus from adhesions, or associated relaxation of the supporting fascial structures of the pelvis. But in a great majority of the cases under consideration retroversion, although not the sole lesion, was distinctly the outstanding one and, therefore, may be regarded as the primary cause of the patient's symptoms.

The term retroversion, strictly speaking, refers to a displacement of the uterus, in which the organ simply is turned backward upon an imaginary axis corresponding to the level of the internal os, and in which the relation between the corpus and the cervix remains unchanged. In the latter stages of many retroversions, however, there is an associated retroflexion or backward angulation at the junction of the cervix and the corpus by which the malposition becomes a combination of the two lesions, appropriately called by many retroversion-flexion. But, since the two conditions are so frequently associated, it may be assumed that their etiology and symptoms are identical, and therefore they may be considered together. Hence the term retroversion is used in its broader sense and is taken to mean either simple retroversion or a combination of retroversion and retroflexion, especially as there is no difference recognized in their treatment. Simple retrocession, in which the uterus is carried bodily backwards, and where there is no change in the normal version or flexion, is not regarded in this class.

*Read at a meeting of the New York Obstetrical Society, December 14, 1926.

It is not the purpose of this essay to consider the subject of retroversion in the abstract nor in this connection to review the anatomy and function of the various supporting structures of the pelvic organs and the effect that alteration in them has upon the position of the uterus. But it may be desirable to note that the literature upon this subject and upon the subject of prolapse is quite vague in the matter of clearly differentiating the causes of these two lesions and many authors are inclined to consider retroversion as due to precisely the same fascial defects as prolapse or, indeed, to regard retroversion in many cases as the first step in descensus and therefore an essential part of the latter condition. One standard textbook states that uterine prolapse is invariably preceded by a stage of retroversion, a dictum which is not borne out by our experience, as we have seen numerous cases of prolapsed uteri in which the corpus has been found close up behind the symphysis pubis. These points are recalled in order to emphasize that retroversion, to use an obstetric term, is essentially a change in attitude of the uterus, whereas prolapse, on the other hand, is an alteration in the height or level of the organ. They are separate conditions, dependent largely upon different causes and may be seen either quite alone or in various combinations.

AGE INCIDENCE

UNDER 20 YEARS	20-29	30-39	40-49	50 AND OVER
12	516	358	71	43

A normal pelvic diaphragm, of which the fan-shaped plane of fascial structure in the base of the broad ligaments is one of the chief elements, maintains the cervix at its proper level. This augmented fascial area, often termed the cardinal ligaments of the uterus, is quite distinct from the structures which go to maintain the uterus in its normal attitude of anteversion, an observation which, if correct, proves the futility of attempting to cure prolapse by a combination of perineorrhaphy and correction of a retroversion. The influence of the round ligaments upon the height of the cervix is little or none, but they, together with the connective tissue bands in the middle and upper part of the broad ligaments, are the most potent agents in holding the corpus forward. By drawing the uterus to the hollow of the sacrum and thereby rotating the organ upon its imaginary axis, the uterosacral ligaments, without doubt, contribute also to this same action.

The age incidence of the women of this series is not an important factor in the analysis and is entered simply as a matter of record. However, it plainly may be seen to reflect parturition as one of the principal causes of the lesion, as a great majority of the patients applied for treatment in the third and fourth decades of life, in contra-

distinction to the higher age incidence of uterine neoplasms. Only 12 of the patients were less than twenty years and most of these had the so-called congenital type of retroversion that is regarded as productive of pain or other disorders associated with menstruation. Slightly more than half of the patients were in the twenties, of whom more than three-quarters were in the latter half of this period. About a third were in the thirties, making an aggregate of nearly 90 per cent between the ages of twenty-one and forty. The remaining women, a little over 100 in all, were more than forty years of age, and of these more than two-thirds were less than fifty.

The question as to what percentage of all varieties of retroversion gives rise to symptoms would appear to be a difficult one to answer and could be solved only by routine pelvic examination of a large series of women taken at random. Nevertheless, it is hard to see how very many of the women who come under the observation of the gynecologist for retroversion can be without symptoms, as it is almost always because of symptoms referable to the pelvis or abdomen that the patient is obliged to consult a physician. There are many who deny that simple movable retroversion is ever an operable condition and condemn this method of treatment. In a comparatively recent address, Dr. George Gray Ward, surgical director of the Woman's Hospital, took occasion to answer a much-discussed editorial upon this subject by a well-known general surgeon, in which the latter accused the profession, particularly gynecologists, of subjecting thousands of women to what he termed the unwarranted procedure of operation for retroversion. The undesirable effect such a statement might have upon "the superficial reader, the unsophisticated, and the inexperienced" was pointed out, and figures from Dr. Bullard's study, made in our clinic, were quoted, showing, among other things, a relief of symptoms, chiefly backache, in every one of 23 cases of uncomplicated retroversion which were corrected surgically.

As before noted, many of the present series had varying degrees of adnexitis or small neoplasms of the uterus or ovaries as complications, but a total of 151 patients, or approximately 15 per cent, showed no pathology other than the malposition, and the correction of this was the only surgical procedure carried out, except for a prophylactic appendectomy, which it is our custom to perform when the organ is accessible and others factors permit it. Of these simple uncomplicated retroversions, more than 80 per cent showed after operation complete relief of symptoms for which the patients were admitted to the hospital, and an additional 15 per cent showed varying degrees of improvement, leaving only 5 per cent of the entire sub-group to be classified as failures. The most prominent symptom in these uncomplicated cases was abdominal pain, and it occurred as the chief complaint in approximately one-half of them, whereas backache was

found to be the outstanding complaint in only about 25 per cent. This series, therefore, fails to verify the generally accepted teaching that backache is the classical complaint in simple retroversion. Five per cent of the women with uncomplicated lesions gave sterility as their chief complaint, and about the same proportion were admitted because of dysmenorrhea. Another small group applied for treatment because of other menstrual disorders and irregularities, chief of which was metrorrhagia.

SIMPLE UNCOMPLICATED RETROVERSIONS (151)

SUCCESSSES	PARTIAL SUCCESSSES	FAILURES
121 (80%)	21 (15%)	7 (5%)

The symptoms presented by the entire group, as mentioned before, were quite likely aggravated by the accompanying pelvic pathology, but it is reasonably safe to assume that the retroversion,—in these cases the outstanding lesion,—was the chief contributor to the patient's discomfort. Just as abdominal pain stood out most prominently in the uncomplicated group, so did this symptom appear as the chief complaint in the largest number of the series taken as a whole. A total of 484, or nearly 50 per cent, of the 1,000 patients gave abdominal pain as their chief complaint, while only 17 per cent came in because of backache. The pain was generally described as a sensation of vague pressure, discomfort in the hypogastrium, often more prominent on one side or the other, and aggravated by general fatigue or menstruation. Many of these patients complained secondarily of backache or disturbances of menstruation, and a large number had bladder irritability and sensation of pressure and bearing-down in the

PRIMARY OR CHIEF COMPLAINT

Abdominal pain, 484.	Leucorrhea, 40.
Backache, 171.	Menorrhagia, 28.
Metrorrhagia, 52.	Sterility, 26.
Miscellaneous, 199.*	

*Includes dysmenorrhea, pressure on rectum, bearing-down, frequency, urgency, dyspareunia, headaches, habitual abortion, "falling womb," fatigue, general asthenia.

perineal region. Menorrhagia or metrorrhagia, or both, was the primary complaint in 8 per cent of the patients, and of the two symptoms an irregular type of uterine bleeding was shown to be almost twice as common as a prolonged or otherwise altered flow coming at the regular time. That leucorrhea may be caused rather frequently by other than cervical lesions seems to have been demonstrated by these women, as forty of them came to us with that complaint, of which only one in five had an accompanying endocervicitis. The next most numerous group was made up of sterility cases, 26 women applying for treat-

ment primarily on that account and 19 others mentioning it as a secondary symptom. Of the patients who did not present symptoms already mentioned, there remains a motley group making up about 20 per cent of the whole number, and among the complaints elicited were dysmenorrhea, dyspareunia, rectal pressure, bearing-down, frequency, urgency, headaches, habitual abortion, "falling womb," early fatigue, and general asthenia.

In view of the recent impetus given to the investigation of sterility by the study of compatibility of spermatozoa with vaginal secretions and of transuterine gas insufflation of the fallopian tubes, it may be well to record at this point our results of operative treatment of this condition where retroversion was a factor. In only one of the 45 sterility cases was there an anatomic failure of the retroversion operation during the period of follow-up observation, while, considered from the subjective standpoint, it is found that 12 patients, or about 22 per cent of the group, were successes, in that they became pregnant within a few months. Two-thirds of these women had simple, uncomplicated, freely-movable retroversions, and in one-third the mobility of the uterus was restricted by inflammatory adhesions and the appendages were more or less involved in the process. Therefore, a little better than one in four patients was relieved of sterility following the correction of a retroversion, regardless of the presence or absence of complicating lesions.

All our public ward patients are instructed to attend the follow-up clinic, the laparotomies remaining under observation two years, the plastic cases three years, and the malignant processes indefinitely. Quite naturally, not all cooperate to the fullest extent in this respect, but a fairly good percentage is secured on the whole, and in this particular group the average period of observation was between nineteen and twenty months.

In the interpretation of end-results the success of the operation is judged both objectively and subjectively. In this study the objective findings concern only the position of the uterus and interpret whether or not the organ has remained in the new position throughout the period of follow-up. The subjective findings are concerned with the patient's own feelings and, as we see it, are much the more important aspect of this work. Is the patient glad she had the operation? Is she relieved in part or in whole of the symptoms for which she entered the hospital?

The classical operations for correction of retroversion need not be described or even enumerated here, but it may be well to record a few facts as to the commoner types of operation done in our clinic. All of these operations depend chiefly or entirely upon the round ligaments to support the corpus in its anterior position. Standard operations, such as the Gilliam, Baldy-Webster, and Coffey, which find great

favor with the general surgeon, are comparatively little employed, while the Simpson-Montgomery procedure is extensively used, either alone or in conjunction with plication of the uterosacral ligaments as described by Noble and others. The operation presented in a paper before this Society by Dr. Grad, in 1921, consisting of a subperitoneal suture of the round ligament to the fibers of the internal ring, is done in a fair proportion of cases, as is the procedure devised by Dr. Bissell. A word may be said about the latter which Dr. Bissell did first in 1901 and since has modified to a certain extent. In it a distinct departure from the usual round ligament suspension type of technic is made, for not only is the round ligament utilized, but, in addition, the broad ligament is split and plicated, making a doubly strong support. The normal anteversion is somewhat overcorrected and accentuated and a single absorbable suture, intended to hold only during the hospital period, apposes the corpus to the anterior abdominal wall. Ventral suspension or fixation by plain or chromicized catgut, or by some non-absorbable suture material, is used fairly frequently, particularly in those cases where the childbearing function has been eliminated by salpingectomy. In a few cases of this series the external Alexander operation was employed, and four times in all the surgeon made use of plication of the uterosacrals without utilizing other supporting structures.

SCHEDULE OF OPERATIONS

Simpson-Montgomery,	370.	Coffey,	43.
Ventral suspension,	160.	External Alexander,	17.
Gilliam,	113.	Ventral fixation,	12.
Bissell,	110.	Modified Simpson,	12.
Grad,	83.	Baldy-Webster,	10.
Simpson-Noble,	63.	Others,	7.

The anatomic results of this group of operations, as a whole, proved surprisingly good, but before recording them, the relative numbers of the various types may be noted, so that the comparative merit of each may be gauged. The Simpson-Montgomery operation proved the most popular and was done upon approximately 43 per cent of the patients, a small proportion of these having plication of the uterosacrals as well, although the latter procedure is regarded only as an adjunct to the former. Ventral suspension was next in order of frequency and was done in 16 per cent, while the Gilliam and Bissell methods stood about equally at, roughly, 11 per cent each. The Grad operation was chosen in a little over 8 per cent, and the Coffey in about 4 per cent. The remaining cases, totalling between 5 and 6 per cent of the whole, were distributed among seven different types of operation, ranging from 17 cases of the external Alexander downward through various smaller numbers of ventral fixation, Baldy-Webster, modified Simpson, the

internal Alexander, and simple plication of the uterosacrals by either the abdominal or the vaginal route.

In only 40 of the 1,000 cases were anatomic failures reported. So in 24 out of 25 women the uterus was found to be in good anterior position as long as they remained in the follow-up clinic, and since the period of observation averaged nearly twenty months, it may be safe to assume that most of these cures were permanent ones. This finding speaks well for the mechanical efficacy of the average operation for retroversion and leaves little to be desired from the standpoint of operative technic, particularly as the work was performed by a number of individuals with resulting variation in the actual execution of the several steps.

The time at which recurrence took place ranged from one month to two and a half years, the longest of these having followed a full-term pregnancy and difficult operative delivery. The average time of recurrence for the group of anatomic failures was ten months. The question arises whether the relative merit of the various operations should not be interpreted with some reservations, as the best results in a rather complicated procedure, such as Bissell's, can be obtained only by those skilled in exactness of technic, whereas operations, such as the Gilliam or the Coffey, that are relatively simple to do, should be performed almost equally well by all who are familiar with surgical technic in general.

APPROXIMATE PERCENTAGE OF RECURRENCES

Plication of uterosacrals,	50.0	Grad,	4.0.
Baldy-Webster,	10.0	Coffey,	2.5.
Ventral fixation,	10.0	Simpson-Montgomery,	2.5.
Gilliam,	4.4.	Ventral suspension,	1.9.
Bissell,	1.8.		

The highest percentages of failures were found in those cases where the uterosacrals alone were utilized, since two of four such operations promptly failed. The Baldy-Webster failed once in ten times, too small a total, of course, from which to draw deductions, but the varying complications and disappointments recorded by Dr. Polak in his study of 376 cases leave much to be desired for this procedure. The Gilliam and the Grad were next in order of recurrence with 4.5 and 4.0 per cent of failures, respectively, while the Simpson-Montgomery and the Coffey each failed in 2.5 per cent. Of the types done at all extensively, Bissell's operation and the several varieties of ventral suspension showed the best results with slightly less than 2 per cent of failures in each case. The external Alexander registered no failures in 17 attempts, a record which strongly justifies the recognition of a technic now little used because of its limited field of application.

An interesting observation with regard to these anatomic failures

is that three out of five were relieved of the symptoms for which they were admitted, regardless of the recurrence of the displacement, suggesting the extent to which the complicating lesions contributed to the patients' discomfort. Only two-fifths of the anatomic failures were partial or complete failures symptomatically as well.

The end-results of these operations, considered subjectively, are more difficult to classify than when estimated from the objective standpoint. This is largely because very few of the women entered with a sole complaint so that the presence or absence of that one symptom or condition later would be the criterion upon which to formulate judgment. A great majority of these patients came in complaining of two, three, or even four distinct symptoms, so that the total number of instances of persistence of backache, abdominal pain, sterility, or other symptoms becomes considerably larger than the number of individuals in whom they occur.

WHOLE SERIES CONSIDERED SUBJECTIVELY

Successes,	880 (88 per cent).
Complete or partial failures,	120 (12 per cent).

An aggregate of 120 patients was classified as partial or complete failures in the entire series, making successful outcomes in 88 per cent of the patients operated upon, but as many of those unrelieved had more than a single persistent symptom, the number of unsuccessful attempts to relieve individual complaints was a little more than doubled. The analysis of individual symptoms shows that operation had a higher percentage of good effect upon some varieties of complaints than upon others. The relief of abdominal pain and backache, for instance, is more often produced than improvement in the various menstrual disorders, including dysmenorrhea, or a favorable effect upon sterility, as shown previously.

Abdominal pain and backache were relieved in about 90 and 85 per cent of cases, respectively, whereas the menorrhagias and metrorrhagias were improved in only a little over 60 per cent.

FULL-TERM PREGNANCY IN SUSPENDED UTERI

Total number, 34.	{ Subsequent recurrences, 5.
	{ No effect upon position, 29.

On the whole, the end-results from the standpoint of the patient certainly warrant surgical interference in the type of lesion encountered in the patients of this series. Nearly nine out of ten women were completely relieved of the symptoms for which they entered the hospital, and many of the small group not completely cured showed appreciable improvement.

The effect of pregnancy upon the suspended uterus seems to be of little consequence, judging from this group of patients, although the number of parturitions following operation is too small to draw valuable deductions. Altogether, 76 women became pregnant while under our observation, but half of these went elsewhere for their confinements and could not be located for examination after delivery. Of the 38 patients observed, 34 continued to full term and four aborted spontaneously at various stages. In all but five of the full-term cases the uterus was found to have remained in good position after delivery, an aggregate of 85 per cent of successes. Of the five anatomic failures, four were done by the Simpson-Montgomery method and one by the Bissell, and in none was the organ in more than what is commonly described as first or second degree retroversion. The four women who miscarried did so without effect upon the position of the uterus, two having had a ventral suspension and two the Simpson-Montgomery method. One patient, a case of Grad suspension, developed a tubal pregnancy a year later and came to laparotomy again on this account, although the position of the uterus remained good.

SUMMARY

The observations made in the course of this study may be summarized as follows:

1. Retroversion as seen and treated at the Woman's Hospital is most often complicated by an accompanying inflammation of the cervix or adnexa with resulting peritoneal adhesions which restrict or even completely inhibit the mobility of the corpus.

2. In very few or no instances can the operator be accused of unwarranted surgery in this group of cases. Even in the patients whose uteri were freely movable, a definite complaint was present, and in over 90 per cent of these distinct improvement followed correction of the malposition.

3. The percentage of all retroversions which produce symptoms cannot be determined from a group such as this, for all these women, except possibly a few who came for sterility, presented definite complaints before operation.

4. Abdominal pain of various types and degrees appears to be a more constant symptom in retroversion than the time-honored backache, although the latter also appears in a large proportion of cases.

5. Retroversion, more than almost any other gynecologic lesion, is an affection of the childbearing period.

6. Only 4 per cent of a large series of patients with retroversion complained of sterility, and more than half of these had also inflammation of the adnexa. Pregnancy followed operation, roughly, once in four cases.

7. The series shows 96 per cent of anatomic cures throughout the period of observation, which averaged twenty months, speaking well for the present-day method of handling this condition.

8. There appears but little to choose between the several varieties of round ligament suspension as far as mechanical end-results are concerned. Of the operations frequently done, Bissell's yielded the lowest and Gilliam's the highest percentage of recurrences.

9. The plication of the uterosacrals alone was distinctly unsuccessful in the few such cases done, although they are probably valuable adjuncts in other suspension methods.

10. End-results of retroversion operations considered symptomatically, appear to depend largely upon the symptoms which the lesion produces. One may expect a higher proportion of cures when the patient enters for pain, backache, or other discomfort than when she applies for relief of sterility or some disorder of menstruation.

11. That the reconstructed supporting ligaments of the uterus can undergo evolution during pregnancy is demonstrated by the paucity of spontaneous abortions in women who have undergone operation.

12. A full-term pregnancy was followed by a recurrence of retroversion in a previously-suspended uterus, roughly, but once in seven cases.

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(For discussion, see p. 801.)

121 EAST SIXTIETH STREET.

A CASE OF ABDOMINAL TWIN PREGNANCY PRESENTING UNUSUAL FEATURES*

By JAMES A. HARRAR, M.D., NEW YORK, N. Y.

ABDOMINAL pregnancy, perhaps better termed advanced ectopic pregnancy, has occurred ten times at the New York Lying-In Hospital in 156,000 confinements, an incidence of one in 15,600. It is possible to judge from a study of the histories that these cases were all of the secondary abdominal type. Five were true intraligamentous, two tuboabdominal, one, the rarest type of all, uteroabdominal; and two indeterminate, as the sac adherent to the anterior abdominal wall was opened into directly and not otherwise oriented. These ten cases include the three cases previously reported by Drs. A. B. Davis and C. F. Jellinghaus, and a fourth case about to be described.

The majority, six, occurred in primiparas; three in para ii, and one in a para iii. Six women lived and four died, a mortality of 40 per cent. Of the four that died, two were frankly septic on admission, and one was in hemorrhagic shock from efforts at vaginal delivery before admission to the hospital. The fourth died from hemorrhage accompanying removal of the placenta of a living fetus. Of the six that lived, all were delivered of macerated fetuses by laparotomy. Of the four that died, two had macerated and two had living fetuses.

The two infants that were born alive died within a few hours, one a six months premature and the other at full term, of atelectasis and asphyxia.

It is evident from these histories, as Cragin states in his textbook, that the diagnosis is often overlooked and in many cases difficult. The landmarks of the pelvic organs are largely obscured by inflammatory adhesions binding them together, the uterus is often incorporated with the gestation sac and seems practically a part of it.

Three helpful points in diagnosis should be:

1. History in the early months of supposed miscarriage, with possible passing of shreds of tissue.

2. Ability to feel the fetal parts suspiciously close beneath the abdominal wall. This is not so valuable a sign as would at first appear, it is not uncommon in normal intrauterine pregnancy, and abdominal tenderness in advanced ectopic pregnancy usually prevents satisfactory palpation. An attempt to make the uterus identify itself by stimulation to contraction would help to differentiate it.

3. The most important is finding the uterine canal short and empty.

*Read at a meeting of the New York Obstetrical Society, December 14, 1926.

CASE REPORT.—Mrs. L. B., aged thirty, a para iii, after observation for two months in the antepartum clinic, was admitted to the Lying-In Hospital October 28, 1926, with a provisional diagnosis of dead fetus in utero accompanied with fibroids. There was slight vaginal bleeding, absence of fetal heart sounds, and the fundus measured 23 cm. above the symphysis. The Wassermann test had been reported as three-plus. Her previous history in the antepartum clinic was that on September 1, the fundus was 27 cm., the size of an eight months pregnancy, that the fetal movements were active but that there were no fetal heart sounds audible. At her second visit, September 15, the fundus measured 28 cm. On October 11, the fundus had decreased to 23 cm. and recently she had had a sudden pain in the left upper quadrant while being examined in the clinic, and felt as though something were suddenly bulging there. She never felt life after that time. Her previous obstetric history was that she had had one child four years previously and subsequent to that a miscarriage. She was a former patient of Dr. N. R. Lederfiend, who has kindly given us the following history:

During 1925 she had complained on several occasions of menstruating every few days, and of dyspareunia. Upon bimanual examination the uterus had been sensitive and the left adnexa very tender. Her blood pressure was 110/70 and her Wassermann test two-plus. She was anxious to have a baby as her first child had died when nine months old of convulsions. He gave her treatment for syphilis. In March of this year she came to him two months' pregnant and he repeated the antisiphilitic treatment. Two weeks later she was seized with a severe pain in the lower abdomen and dizziness. He found the abdomen quite tender, pulse and temperature normal, and no vaginal bleeding. The pain was relieved with morphine, but in a few days it recurred with fainting spells, and she remained in bed two weeks.

The patient herself gave us the following history: Her last monthly period was in January, 1926. The attacks of pain which she had in March and April were similar to severe menstrual cramps. These lasted with decreasing severity for two weeks and she then returned to work and worked until the first of July, when she had an attack of pain similar to that in April. This attack lasted a week and then cleared up. From that time on she had occasional mild attacks of pain in the lower abdomen.

On admission (October 29, 1926), the red blood cells were 3,640,000, hemoglobin 70 per cent, temperature 99.4°, pulse 90, and respiration 24. There was slight vaginal bleeding for the first time.

On November 6, after two days' dilatation of the cervix with iodoform gauze, it was possible to pass the index finger about ten cm. to the top of the uterine cavity where indentations to either side represented evidently the tubal ostia. This examining finger in the uterus could be closely approximated to the external abdominal hand to the right of the adjoining large mass that extended behind and to the left almost to the umbilicus, and a diagnosis of advanced ectopic pregnancy was made.

At operation two days later, through a median incision below the umbilicus a purple cystic mass, 13 cm. in diameter, presented. There were a few omental adhesions to the anterior abdominal wall and to the anterior surface of the tumor requiring ligature. This mass was otherwise covered with smooth membrane resembling peritoneum. It was adherent to the posterior surface of the uterus, which was pushed forward and to the right and which was enlarged to the size of a three months' pregnancy. The tumor mass was also adherent to the brim and cavity of the false pelvis posteriorly. All of these adhesions were broken up manually without much bleeding, except at the left cornua of the uterus just posterior to the insertion of the left round ligament where the tumor was firmly attached. Later examination showed the left tube stretched across the posterior surface of the mass. The mass was then cut away from its firm sessile attachment at the left uterine cornua,

the oozing from the cut uterine muscle controlled with mattress sutures, and a loop of round ligament stitched over it.

Below the tube and attached to the posterior surface of the tumor mass was an irregular hard calcareous structure about 4 cm. in diameter, at first thought to be a calcified ovary. The left ovary was afterwards identified at a distance from this calcareous structure.

At this point in the operation deep in the abdomen among the prolapsed intestines was disclosed the end of a yellow degenerated umbilical cord, torn off unobserved from the under side of the large mass during separation of the adhesions. Following this up a badly macerated seven and a half months' fetus was discovered and withdrawn from just beneath the liver. Loops of small intestine were intimately adherent to one side of the fetal head and to its abdomen just above the umbilicus. The skin of the scalp and of the abdomen of the fetus was clipped away and left adherent to the loops of small intestine.

A number of small masses resembling small cooked lima beans in size, shape, and color, each attached by a stringy pedicle were clipped away from various locations on the omentum, tumor mass, and intestine. These later proved to be small organized blood clots, and were the only remaining signs of previous intraabdominal hemorrhage.

All that remained of the sac were some thick yellow fragments of membrane picked out from between coils of small intestine. Three large drains were inserted behind the uterus and up toward the location of the removed fetus. No vaginal drainage was employed.

The drains were removed entirely in a few days. The convalescence was uneventful and the patient was discharged on the fourteenth day.

Pathologic Report (By Dr. Losee).—The specimen was composed of a spherical mass of tissue removed from the cornua of the uterus measuring 15 by 12 by 12 cm. and a fetus with the umbilical cord attached. Its surface was smooth and apparently covered with peritoneum. A portion of the fallopian tube, 6 cm. in length, was attached to this tumor and adherent to the fimbriated extremity of this tube was a calcareous structure which proved to be an embryo, of about the third month. There was also an ovary adherent to the mass and situated about 3 cm. from the fallopian tube. Section of tumor showed it made up almost entirely of placental structure infiltrated with blood and covered with several layers of a dense connective tissue. Microscopic examination of sections from different areas showed numerous chorionic villi with extensive red-celled infiltration in the intravillous spaces and some canalized fibrin. On the surface there was much thickened chorion and amnion. Microscopic examination of that portion of the tumor in which typical uterine muscle was observed, showed a portion of the fallopian tube which passed through the uterine wall. Serial section of the structure in this area showed a definite cavity partially lined by a single layer of epithelium and somewhat distorted. It did not line the entire cavity. The cavity contained red blood cells and a portion of the wall was absent. It is quite possible that the rupture took place in this location out between the layers of the broad ligament.

Microscopic examination of that portion of the fallopian tube which was attached to the tumor showed typical structure and the lumen empty. The muscle coats were hypertrophied and edematous.

The smaller embryo at the fimbriated extremity of the tube exhibited some calcification of the head, with the ribs and some of the long bones apparent.

The ovary measured 2.5 by 2 by 1.5 cm. Section showed small cysts of the follicles and edema of the stroma. There was no corpus luteum observed.

The larger fetus measured 33 cm. and presented extensive maceration of the skin and subcutaneous tissues, as well as of the entire viscera. Section of the lower extremity of the femur was negative for osteochondritis.

The umbilical cord was 37 cm. in length and presented a definite constriction at the placental extremity. There was no cord observed on the surface of the tumor mass.

Diagnosis.—Ruptured intraligamentous twin tubal pregnancy.

From the gross and microscopic examination of the specimen it is quite possible that this pregnancy took place in that interstitial portion of the tube adjacent to the isthmus. This was a case of primary intraligamentous twin pregnancy, becoming abdominal. We have a definite history of left-sided pelvic inflammation antedating conception. The case is also interesting in that one of the twins succumbed at the third month and was well on its way of becoming a lithopedion five months later, while the other twin lived for seven and a half months and then died coincidentally with rupture of the sac intra-abdominally a month before operation.

119 EAST SEVENTY-FOURTH STREET.

(For discussion, see p. 797.)

PREVENTION OF CARCINOMA OF THE CERVIX*

By H. R. CHARLTON, M.D., BRONXVILLE, N. Y.

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"All assertion in this world of doubt is insolence."—Conrad.

THE time has come to consider cancer prevention. No one could have listened through the days of the Mohonk Cancer Conference without realizing that the world is fully awake to the seriousness of this pathology and utilizing a high intelligence in developing agencies for its study and treatment. As one result an educational propaganda is being disseminated among practitioners, students of medicine and the general public, its outstanding message being the imperative necessity of early recognition. A note of hopefulness rings through all this effort, in that appreciation of cancer's earliest signs, promises an increasing number of arrests.

It is quite natural that specialists from their respective departments should stress for the consideration of men engaged in general work, significant signals from the anatomies best known to each, and so the laryngologist asks special consideration for hoarseness appearing without obvious cause, the general surgeon warns of the veiled meaning of difficulty in swallowing, substernal discomfort, persistent digestive disturbance of doubtful origin, and asks closer scrutiny of

*Presented at a meeting of the New York Obstetrical Society, December 14, 1926.

hemorrhoidal protrusions, while the gynecologist lays special emphasis upon the significance of irregular uterine bleeding and persistent vaginal discharge. In all countries today the slogan is early diagnosis, immediate treatment.

This is not enough. From concentrated study directed to this or that system, may come valuable suggestions in line with measures instituted so effectively against infectious diseases in the course of the past thirty years, and any well-founded observation which suggests a practical measure to be directed toward the prevention of cancer must assume definite importance. This contribution is a statement of my attitude toward the prevention of a type of carcinoma which in the United States registers a mortality of over ten thousand women yearly. Ewing, Sampson-Handley, Leach, Bastianelli and many others have insisted on the importance of persistent irritation in the cause of cancer, recalling the relationship between lip cancer and cigar or pipe irritation; buccal cancer and irregular foul teeth; scrotal cancer and the soot-sebaceous mixture, chronic infection and prostatic malignancy, and epitheliomata developing in x-ray workers. Recent observations link pyorrhea with throat, esophageal and gastric new growth, while injuries, sudden termination of nursing and mastitis are among the recognized precursors of breast carcinoma. You are all familiar with the work which has demonstrated the rôle paraffin and tar may play in causing new growths in laboratory animals.

In a survey of more than one hundred cases of carcinoma of the cervix, I have observed, and no doubt my observation is common knowledge, that the vast majority of patients so afflicted, have had this new growth engrafted upon a previously diseased cervix. Apparently every carcinomatous cervix had been the site of definite chronic cervicitis, preceding the malignancy, leaving the relationship when correlated with the generally admitted pathologic excitants elsewhere, startlingly suggestive.

Chronic cervicitis manifests itself symptomatically by vaginal discharge. In most cases applying for diagnosis and treatment, the presence of leucorrhea means cervicitis of greater or lesser degree. At any period of life, in all social states, it is the most common disease brought to the attention of the gynecologist, and constitutes the main pelvic reason for leading women to consult physicians. Because it persists through years, eternally stimulating abnormal epithelial tissue changes in an area prone to many insults, it constitutes the classic example of a predisposing cause for a malignancy which is a very scourge to women. Chronic cervicitis may regularly precede cervical carcinoma. It is a curable or removable disease. Doctors are insufficiently informed concerning its importance, its diagnosis and treatment, students are too little taught and public education has scarcely been attempted, yet a proper utilization of these channels

may lead to the broad ocean of safe sailing. The general recognition and cure of chronic cervicitis will cut down this incidence and might eradicate in large measure cervical carcinoma, which eradication would save ten thousand years of suffering in every one year of our national life.

Let every man working in the department of gynecology realize his unique privilege in that his specialty presents a carcinoma which develops within the field of his vision and his touch, that cervicitis is its common precursor, that once the disease appears only a pitifully small number of patients will be seen in time for help, and of these but a fraction will receive care from those few gifted and enthusiastic workers who, since the physiologic effects of radium have been appreciated and the technic of its application understood, have devoted their best energies toward arrest or cure. Knowing this, let every chronically infected cervix be approached, not as a cervical catarrh, not as an hypertrophy, not as a laceration, but as the prologue of an epithelial drama whose curtain may be a malignant death.

(For discussion, see p. 798.)

THE PRINCIPLES OF THE TREATMENT OF GENITAL PROLAPSE. THE TECHNIC OF VENTROFIXATION OF THE VAGINA*

By L. FRAENKEL, M.D., BRESLAU

(Professor and Head of the Department of Gynecology and Obstetrics)

THE treatment of genital prolapse is essentially operative. The nonsurgical methods, including pessary treatment, massage and gymnastics, are only palliative; they do not cure. The prophylaxis of procidentia will not be considered as this requires too extensive a discussion.

The methods of operation were, from an historical standpoint, developed as follows:

1. Narrowing of the vaginal canal (Simon, Hegar) and perineal plastic operations to increase the height of the perineal body (Lawson Tait).
2. Amputation of the cervix (Schroeder, Kaltenbach) or hysterectomy (Fritsch).
3. Ventrosuspension of the uterus (Olshausen, Kelly).
4. Vaginofixation and interposition of the uterus (Dührssen-Mackenrodt, Schauta, Watkins-Wertheim, Kjelland).

*Read at the Thirty-ninth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, held in Chicago, Ill., September 20, 1926.

In the noncohabiting patient narrowing of the vagina to a ring-shaped stenosis may be done. The implantation of metal rings underneath the prolapsed posterior vaginal wall to attain the same end, as recommended by Thiersch and A. W. Freund, has not proved successful.

After extirpation of the entire uterus the stumps of the broad ligaments may be sewed to the vaginal wall, or both may be attached to the pelvic connective tissue of the lateral pelvic wall. In place of ventrofixation a fixation to the sacral promontory may be made (Küstner).

All of these methods helped in some instances and failed in others. In a few cases the methods seemed to be entirely inadequate and a combination of several had to be used. A carefully performed operation for an extensive prolapse requires for its performance ninety or more minutes; the methods vary greatly with different surgeons, a proof that a standardized method has so far not been developed. An operation, based on a sound principle good for all cases, is still wanting.

The operation I have developed and used for many years is perhaps the solution of the problem of surgical cure of genital prolapse. It is termed ventrofixation of the vagina. The suspension operations may be considered the best principle of the four methods mentioned; *however, the vagina and not the uterus should be suspended, even if a total prolapse of the uterus should be coexisting.* When the vagina is replaced upwards then the uterus and the urinary bladder also become replaced; the former does not lose its natural mobility and the cystocele disappears.

Technic: Laparotomy incision: uterus is pulled upwards and outward; transverse incision 2 to 3 cm. long in the vesicouterine fold; separation of bladder downward beyond the vaginal fornix. A suture armed with needles at both ends is now inserted through each half of the vaginal vault to right and to left. Each end is carried forward through (1) the visceral peritoneum, (2) the parietal peritoneum, (3) the external oblique muscle, (4) the abdominal fascia, and (5) the skin. The ends are then securely tied over a small gauze pad, so that the anterior vaginal vault is in broad and firm contact with the abdominal wall. The vesicouterine pouch is closed. Suture of the abdominal wall in four layers. The duration of the operation is twenty minutes. It does not matter whether the suture enters the lumen of the vagina or only penetrates the vaginal wall. The suture should be nonabsorbable and is removed on the fourteenth day, after a fibrous scar has formed in the suture canal. The gauze pads are used to prevent cutting of the skin. Should retroflexion of a heavy uterus coexist then the round ligaments are shortened. If a laceration of the perineum is present then a repair is added. Should the urethral eminence be prolapsed then a plastic for the latter is indicated, but mostly the vaginal suspension alone is sufficient.

Vaginal palpation at any future time elicits the cervix located higher up above the true pelvis beyond the reach of the examining finger. The vaginal canal is decidedly stretched. Edema of the vaginal walls has disappeared, the cervix is not elongated any more.

The following objections may be made to this procedure: (1) The vagina is forced directly upward to the anterior abdominal wall; it separates the bladder in two and prevents distention and filling in the median line. The disadvantage is transitory. About 25 per cent of the patients complain of ischuria or strangury following the operation. The symptoms invariably disappear within a few days spontaneously and, after application of a permanent catheter, immediately. Thereafter the capacity of the bladder is not lessened, because the lateral parts expand. Permanent difficulties have never been seen. (2) The vagina is fixed. This might interfere with (a) cohabitation, or (b) labor. The former does not occur. Labor after ventrofixation of the vagina has not been seen, as only patients beyond the childbearing period were subjected to the operation. Theoretically the uterus should always be freely movable and the vagina does not require mobility during labor pains. The vagina is passively widened, which is not prevented by the fixation. The fixation above the symphysis pubis constitutes a fixed point promoting a descent of the fetus without a simultaneous descent of the vaginal wall. The period of expulsion may be rendered more painful, due to the pulling on the adhesions. Such complications may be prevented by sterilization or confining the procedure to women past the childbearing period.

The operation has been performed many times during the last ten years without a single recurrence. Should a recurrence occur then faulty technic is the cause.

The ventrofixation of the cervix, which Bumm published some time later, also attempts to place the point of suspension downward. It does not go sufficiently far downward, however, does not fully follow the principles expounded, and makes labor absolutely impossible. The ventrofixation of the vagina as described does not offer any technical difficulties. A trial of the operation is urgently recommended.

Ahlfeld: Rectal Examination. Zentralblatt für Gynäkologie, 1925, xlix, 4.

Rectal examination is not by any means as devoid of danger as is supposed, and in no way equals vaginal examination for the purpose of diagnosis. Proper use of his "Hot Water-Alcohol" hand disinfection will render vaginal examination safe and much more satisfactory than rectal examination.

LITTLE.

A NEW SAGITTAL PELVIMETER

By H. ACOSTA-SISON, M.D., MANILA, P. I.

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IT IS useless for me to stress the importance of measuring the pelvic outlet in a primipara or a multipara with the history of prolonged labor. Klien,¹ Williams,² Daniels³ and others have repeatedly demonstrated its value as a guide in the proper management of labor in a given case. McCormick⁴ gives an exhaustive review of the subject in the June number (1926) of the AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY.

The engagement of the head is a satisfactory indication that the pelvic inlet is obstetrically efficient, but it does not imply that the pelvic

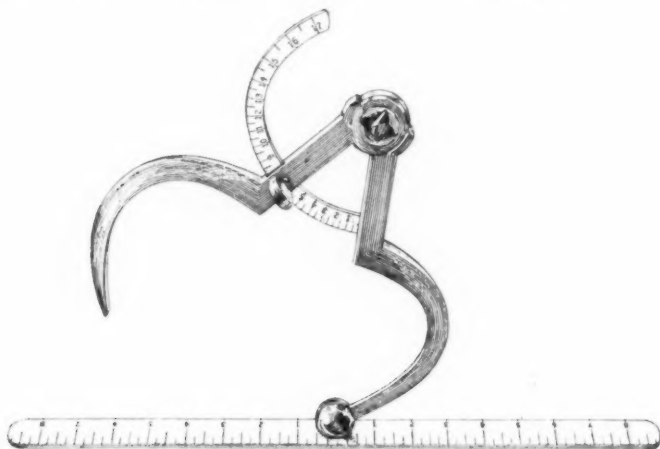


Fig. 1.—Acosta-Sison pelvimeter.

outlet is equally efficient to allow the birth of the head by the natural route.

On studying the table worked out by Williams in his textbook, one can safely establish a guide that as long as the transverse diameter and the posterior sagittal diameter together measure 15.5 cm. spontaneous labor is within the limit of possibility, and if the sum of both diameters is below 15.5 cm. spontaneous labor is out of the question. I believe that to remember this is easier than to memorize each number of centimeters that the posterior sagittal must elongate for every centimeter or half a centimeter of contraction of the transverse diameter.

Daniels has a somewhat different method of approaching the subject though the result is about the same. He determines the area of the posterior triangle of the outlet and by it he may prognosticate the

possibility of spontaneous labor. Multiplying the transverse diameter by the sagittal diameter and dividing the result by 2, will give the area of the posterior triangle. His formula is as follows:

$$\frac{\text{Transverse} \times \text{posterior sagittal}}{2} = 55 \text{ cm.}$$

or the normal area for an American woman. He claims that a posterior triangle having an area of 33 cm. may allow spontaneous delivery of the child.

In the paper on pelvimetry and cephalometry among Filipino women by Acosta-Sison and Calderon,⁵ it is shown that among Filipinos, 47



Fig. 2.—The bar may be used to measure the intertrochanteric diameter.

is the normal area of the posterior triangle of the outlet and that this area may be reduced to as low as 31 and yet spontaneous delivery might still be possible.

The small posterior triangle given by Daniels and the even smaller measurements of Williams, which according to him will admit the possibility of spontaneous labor, may be a safe guide only when the child is small. If it is of the average size, forceps might be necessary to prevent prolonged pressure and the frequent pounding of the uterine pains on the head. When the baby is above the average size, it is doubtful that with such small measurements, the child can be extracted without deep asphyxia that will ultimately end in death.



Fig. 3.—The manner of taking the posterior sagittal diameter.



Fig. 4.—Technic of feeling for the articulation between the sacrum and the coccyx.

To measure conveniently the posterior and anterior sagittal diameters which extend respectively from the midpoint of the intertrochanteric diameter to the point of the sacrum and from the midpoint of the intertrochanteric diameter to the inferior border of the symphysis, the sagittal pelvimeter herewith presented has been devised.

The instrument consists of a flattened crossbar which is long enough to be fixed against the ischial tuberosities. In the midline of the bar is attached the revolving end of one arm of the pelvimeter. With the crossbar fixed against both ischial tuberosities, the pelvimeter may be made to measure the posterior sagittal diameter and without moving the crossbar from its place, the pelvimeter may be turned forward to measure the anterior sagittal diameter.



Fig. 5.—Measurement of the anterior sagittal diameter.

The crossbar is also graduated into 0.5 to 1 cm. so that it may be used to measure the intertrochanteric diameter. As it is marked from the middle outward, the number registered by the measuring thumb should be multiplied by two in order to get the full measurement of the transverse diameter.

My technic of its use is as follows: The patient is placed on a high table in the lithotomy position with the buttocks at least 12 cm. beyond the edge of the table so that the lower portion of the sacrum may be felt. The thighs with bent knees should be acutely flexed over the abdomen and held in place by straps or by assistants. In this position the outlet is well exposed.

After previous sterilization of the external genitalia including the ischial tuberosities and lower part of the sacrum the tuberosities as well as the sacrum should be well dried with a sterile towel to prevent the crossbar from slipping. After drying both hands, the right hand

adjusts the crossbar against the ischial tuberosities in such a manner that the pelvimeter is exactly in the midline while the left hand feels for the tip of the sacrum and applies thereto the end of the pelvimeter.

The distance between the two points, namely, the midline of the intertrochanteric diameter and the tip of the sacrum constitutes the posterior sagittal diameter. If there is doubt in the location of the tip of the sacrum, the right finger is introduced into the vagina and the coccyx is moved up and down between the two fingers until its articulation with the sacrum is reached.

The anterior sagittal diameter is measured by swinging the free arm of the pelvimeter to the inferior border of the symphysis.

If the above directions are carefully followed, no difficulty should be encountered in taking the sagittal diameters. No assistants are necessary except those who will have to keep the thighs flexed.

Thanks are due to M. Ligaya for the drawing of the illustrations.

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PNEUMONIA AS A SEQUEL TO ANESTHESIA*

By M. PIERCE RUCKER, M.D., RICHMOND, VA.

WHEN our Secretary assigned this subject to me, Woodrow Wilson's favorite limerick came at once to mind:

I never saw a purple cow.
I never hope to see one,
But, I can tell you anyhow,
I had rather see than be one.

This subject is of more than academic interest. As Featherstone says, it is the one condition that starts, runs its course, and ends while the patient is under hospital observation. I have been greatly interested in the history of this complication. In the early days of anesthesia, the surgeons operated with great rapidity. They had been trained on struggling patients who were held by brute force, and were not required to be thoroughly relaxed. The anesthetist was timid and was concerned chiefly with rendering the patient insensible. Dr. Cook has given us a description of the first major operation in Europe under ether anesthesia. "The patient was a man

*Read at the Thirty-ninth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, Chicago, Ill., September 22, 1926.

of thirty-six years, suffering from a disorganized knee joint and it was decided to amputate. The mouthpiece was applied by Squire and the patient soon sank into insensibility * * * Lister rapidly completed the operation in twenty-five seconds, according to Palmer, the dresser. The inhalation had been stopped as the operation was begun. On coming around the patient tried to lift himself, and asked when the operation was going to begin." There seem to have been no pulmonary complications at this period. The professor of surgery at Harvard (Cheever), writing in 1884 upon some of the dangers and disadvantages of anesthesia, makes no mention of any lung complication nor are any mentioned by H. C. Wood in the section upon the "after-effects of anesthesia" in Dennis' *System of Surgery*, in 1895.

The experimental period in anesthesia was followed by one of greater confidence. The surgeon became more deliberate and searching in his work. The anesthesia was entrusted to an interne, who was more afraid of incurring the surgeon's displeasure by not relaxing the patient sufficiently than he was of giving too much anesthesia. I can find no good description of an operation during this period, but that is not necessary. We all have seen the deeply unconscious patient, wet with sweat and possibly also with vomitus, placed flat on his back upon a stretcher and wheeled through cool and often draughty corridors, and put to bed in care of the ward nurse who was not particularly interested in the patient so long as he did not roll off of the bed or was not too noisy. Silk refers to the rarity of postoperative pneumonia in 1897. In 60,244 anesthetics there were 41 cases of pneumonia (0.06 per cent), but by 1906 the incidence of postoperative pneumonia was 3.09 per cent in 28,093 operations.

Finally we come to the third or modern period. The surgeon is still painstaking, but so is the anesthetist. He studies his patient, chooses the most suitable anesthetic, and uses no more of it than is necessary. When the patient leaves the table, the anesthetist sees that he is placed on his side, if that is possible, or at least that the head is turned to one side. He sees that the patient is properly covered while being transported, and that he is put in a warm bed in the care of a special nurse. With such attention pulmonary complications are rare. (Henderson, Magaw, Herb, etc.)

When we come to consider the etiology of postanesthetic pneumonia, we are at once confronted with our very hazy ideas concerning that of any form of pneumonia. About all we are certain of is that it is apt to occur in the presence of any killing disease, be it medical or surgical, and that it has a seasonal variation. When I was a medical student, I was taught that in the winter months some 20 per cent (Stillman says that 60 per cent have Type IV pneumococci) of healthy persons carried virulent pneumococci in their throats. Suppose one of the 20 per cent went duck hunting and came down with

pneumonia several days later. His friends say that he caught pneumonia while duck hunting. The scientific medical man talks vaguely of lack of individual immunity and of lowered resistance. Until we know more of pneumonia in general we cannot speak in very definite terms concerning the ways in which postanesthetic pneumonia arises.

First let us define postanesthetic pneumonia. What is it and what is it not? My colleague, Dr. Willis, tells of going to a distant city to do a herniotomy. A date convenient to the patient and his doctor was set. The doctor met him at the depot with the news that the patient had just had a chill. The next day it was very apparent that he had pneumonia. Of course such a case is not a postanesthetic pneumonia, as there was no operation, but had the day for the operation been set two days earlier as it well might have been, the case would most certainly have been classed as a postanesthetic pneumonia. A dentist removes teeth under a general anesthetic, a lung abscess follows and the anesthesia is blamed (Peters).

On the other hand, a laryngologist removes a pair of infected tonsils under local analgesia (Porter), and the patient develops a lung abscess. Although such a complication might well be considered a post-operative one, it is hard to see how the anesthetic had anything to do with it. But let a surgeon attack an infectious process in the upper abdomen and set free in the blood stream a number of tiny emboli that lodge in the lungs and the case is classified as a postanesthetic complication. Suppose, however, our Fellow, Dr. Farr, does the same thing under local analgesia. Would the lung complication be a postanesthetic one?

Yet regardless of terminology there is a very definite association between lung complications and surgical operations. Many large surgical clinics are reporting a surprising number of such complications. Cutler and Hunt show that one patient out of every 30 to 50 operated upon develops some pulmonary condition and one-fifth of these die from such a complication. And the frequency of these complications seems to be increasing as more attention is directed towards them. This is explained partly at least by greater diagnostic acumen, but it also shows that our knowledge of the factors involved is far from satisfactory.

It seems unwise to limit the attention to any one pulmonary complication. Not only is it difficult always clearly to differentiate the clinical types, but there is considerable evidence that they have common causative factors. The study of one group often throws some light on the other groups. The reporting of all pulmonary complications makes comparisons between various clinics easier.

The pneumonias, lobar and lobular, are the most important both from the standpoint of frequency and mortality. Armstrong reports 14 cases of lobar pneumonia with 9 deaths and 16 cases of lobular

TABLE I. SHOWING THE NUMBER OF CASES AND THE NUMBER OF DEATHS FROM THE VARIOUS POSTOPERATIVE PULMONARY COMPLICATIONS IN SEVERAL LARGE SURGICAL CLINICS

COMPLICATIONS	PETER BENT BRIGHAM HOSP. (CUTLER AND HUNT) 1,562 CASES	MASS. GENERAL HOSP. (CUTLER AND MORTON) 3,490 CASES	MONTREAL GENERAL HOSP. (ARMSTRONG) 2,500 CASES	LAKEVIEW HOSPITAL (ROBB AND DITTRICK) 1,007 CASES*	MAYO CLINIC (BECKMAN) 16,317 CASES
Lobar pneumonia	4	19	14	0	43
Bronchopneumonia	21	21	16	5	19
Bronchitis	17	7	19	18	72
Pleurisy	2	5	6	9	55
Empyema	1	2	0	0	1
Pulmonary embolus	3	6	0	0	7
Lung abscess	2	0	0	0	0
Mediastinitis	0	3	0	0	0
Pneumothorax	0	2	0	0	0
Exacerbation of tuberculosis	5	0	0	3	0
Acute congestion	0	0	0	0	21
Total	55 1 in 28.4	65 1 in 53.7	55 1 in 45.5	35 1 in 28.8	218 1 in 75
	11 in 142	33 in 101	32 in 78	5 in 201	15 in 1088

*Abdominal operations in the gynecologic service.

†In the text 3 cases of pleurisy proved and 3 cases of bronchopneumonia.

pneumonia with 13 deaths in a total of 55 pulmonary complications. Cutler and Hunt, also in 55 cases, report 4 lobar pneumonias with no deaths and 21 bronchopneumonias with 8 deaths. Beckman's proportion of lobar and lobular pneumonia also varied; in 83 pulmonary complications, there were 12 lobar pneumonias and 7 bronchopneumonias.

Whipple has made a careful study of the bacteriology of postoperative pneumonias and finds that the Type IV pneumococcus is almost always the organism involved, giving rise to an atypical pneumonia with a relative low mortality. Cleveland concludes that Type IV pneumonia is a definite entity and differs from Types I, II or III. The relative and varying frequency of the other lung complications in the series reported from the Peter Bent Brigham Hospital, Montreal General Hospital, the Mayo Clinic, the Massachusetts General Hospital and Lakeside Hospital is shown in Table I.

TABLE II. POSTOPERATIVE DEATHS FROM PNEUMONIA

HOSPITAL	AUTHOR	YEAR	
Johns Hopkins*	Wright	Prior to 1903	1 death in 1500.0 operations
Lakeside Hospital*	Robb and Dittrick	1906	1 death in 335.6 operations
Montreal General Hosp.	Armstrong	1906	1 death in 113.6 operations
Mayo Clinic	Beckman	1910	1 death in 731.4 operations
Mayo Clinic	Beckman	1912	1 death in 972.5 operations
Mayo Clinic	Beckman	1913	0 death in 6825.0 operations
St. Luke's Hospital	Derby	1915	0 death in 3125.0 operations
Roosevelt Hospital	Booth	1916	1 death in 373.1 operations
New York Hospital	Baneroft	1916	1 death in 201.9 operations
Mass. General Hosp.	Cutler and Morton	1915-1916	1 death in 158.6 operations
Presbyterian Hosp.	Whipple	1918	1 death in 148.7 operations
Peter Bent Brigham	Cutler and Hunt	1919	1 death in 195.2 operations
Mt. Sinai Hospital	Elwyn	1921-1922	1 death in 146.1 operations
Mt. Sinai Hospital	Elwyn	1922-23	1 death in 236.0 operations

*Gynecologic service.

Recently another postoperative pulmonary complication has been described; i.e., massive collapse of the lung. It was first described by Pearson-Irvine, who noted the condition in a case of diphtheria with respiratory paralysis. Later Pasteur also described it as complicating postdiphtheritic respiratory paralysis and he was the first to note that it followed operations upon the abdomen. In the World War it was a frequent complication of chest injuries. It has also occurred in apparently well persons, without any trauma or operation. Tidy reports a case in which an acute pleurisy was the only discoverable cause. Rigler reviewed the chest films of 285 cases of ordinary pneumonia and found two cases in which collapse of the lung could be demonstrated. The condition has a very definite symptomatology; sudden onset, rapid breathing, dyspnea, fever, expectoration, with

subsidence by lysis in three or four days. The physical signs are very similar to the pneumonitis described by Whipple except that the heart and trachea are displaced towards the affected side. The mechanism of the production of the collapse is obscure. Pasteur insisted that it was an active process, accomplished with patent bronchioles. Elliot, and Dingley believe that the air from the affected area is absorbed by the blood after the bronchioles are sealed off with a purulent exudate. They cite animal experiments to show that plugging of a bronchus produces such a condition, but animal experimentation is not necessary, as Jackson and Manges have shown identical chest pictures following occlusion of a bronchus by a peanut or like foreign bodies. Gwyn reports the collapse of both lungs following blocking of the trachea with a blood clot. In one of Lee's cases autopsy showed a definite occlusion of the bronchus by a plug of mucus. Jackson and Lee report a case of postoperative collapse of the lung that was promptly relieved by removing tenacious secretions through a bronchoscope. Scott, who reviewed all the reported cases, was of the opinion that the closure of the bronchioles was brought about by some sort of reflex action either (1) a vasomotor effect upon the blood vessels, (2) contractions of the bronchioles, or (3) an edema of the mucous membranes somewhat analogous to angioneurotic edema. Whatever its causative mechanism, he believed it was a definite clinical entity and that it was often undiagnosed. He reviewed the twenty cases diagnosed as postoperative pneumonia in the Peter Bent Brigham Hospital in the years 1922 and 1923. All had at least one chest film. Three were undoubtedly cases of massive atelectasis. In five others there were signs strongly suggestive of this condition, but for lack of control films an absolute diagnosis could not be made. He predicted that the condition would be found oftener if looked for. Seringer reports seven cases in 540 operations. Trout has recently reported four cases, all following appendectomies.

The symptomatology of these various postoperative chest conditions has been well described by Whipple, Burnham, Scott, and others. I take it that I had better use my allotted time in discussing the many causative factors, and the different means of prevention that have been advanced. At first it was supposed that the irritating effect of ether answered the whole question and the term "ether pneumonia" is in common use even today. The rivalry between the advocates of various devices for administering ether and also between the devotees of ether and chloroform was responsible in a measure in fixing the odium so firmly to ether. Anyone could see that ether caused increased saliva and must therefore be irritating to the air passages, and a mass of animal experiments showed that ether caused pneumonia. Further experiments, however, showed that ether was irritating to lung tissue only when its concentration was too great. Intra-

tracheal administration of ether seems to cause no irritation of the bronchi, and there have been reports of inhalations of ether actually curing bronchitis. Furthermore statistics from clinics that use chloroform largely, show just as many pulmonary complications. Even operations under local analgesia have been followed by pulmonary complications. In Mikuliez' clinic they have followed analgesia more frequently than inhalation anesthetics. Elwyn reports from Mt. Sinai an incidence of postoperative pneumonia in herniotomies under general anesthetic of 4.5 per cent and under local analgesia of 8.1 per cent. Cutler and Hunt's morbidity percentages were as follows: 3.39 per cent for ether, 4.24 per cent for gas-oxygen, and 1.63 per cent for procaine.

Most of the "bad-risk" patients in their series were given gas-oxygen. The opinion seems to be growing that neither ether nor any other anesthetic agent, unless badly administered, plays a part in the causation of the postoperative pulmonary complications. Considerable discussion has taken place as to the method of administration. Gatch for instance is convinced that when properly done the closed method is followed by fewer pulmonary complications. Most observers (Magaw, Boothby, Bevan, Keen, Herb), however, favor the open method for giving ether. Featherstone states that the intra-tracheal method has reduced the risk in operations upon the tongue and jaw. In twelve months there has been no pneumonia in his service following this method of administration. He attributes this improvement to (a) chance, and (b) permitting the cough reflex to return before withdrawing the catheter.

Herb quotes Silk, after an inspection of nearly 200 hospitals during the war, as being struck by the great variation in pneumonia following the work of different surgeons. In looking up the original reference I find that Silk was referring to poor ventilation rather than poor work. Perhaps this phase of the question has not been sufficiently emphasized.

Climate seems to play a minor rôle, although Riley states that he never sees postoperative pneumonia in Cuba. Seasonal variation, however, is significant. Whipple, Cutler and Morton, Cutler and Hunt, Armstrong, and Robb and Dittrick all report a greater incidence in the winter months. Cutler and Hunt believe that the character of the clientele is an important factor. Large city hospitals have more septic and traumatic work to do. The necessity of taking a 200 or a 1000 mile journey on the train automatically eliminates the serious acute surgical emergencies. On the other hand Wilson states that in the first ten years of the Mayo Clinic there were no pulmonary emboli, whereas after that there was one case in 2331 operations. He explains this increase in part at least by the fact that they were getting more "last resort" cases.

Age seems to be a minor factor. Most of Whipple's cases were between thirty and forty years. Cutler and Morton conclude that age, anemia, alcoholism, arteriosclerosis, weak heart, or susceptible lungs are important predisposing factors.

Pneumonia generally is more prone to attack men than women. Osler gives the ratio as 42 to 33. The ratio, however, in men and women who have undergone abdominal operations is much greater than this, partly, it is believed, because the respiration being of the abdominal type in males, is more interfered with by the operation.

Such factors as the posture, the preparation, and the care of the patient immediately after the operation, have been discussed by many writers at great length. Except that the Trendelenburg position is less favorable to the aspiration of septic material from the mouth, posture is a small factor. Much greater stress is laid upon not chilling the patient either in his preparation, during the operation, or in his transportation from the operating room. (Armstrong, Cleveland, Homans, Keen, Robb and Dittrick, Mudd and Grant, Booth.)

Whipple found a history of previous inflammatory changes in the lungs in 25 per cent of his cases. Cutler and Morton placed great stress upon preexisting lung pathology. Twenty-six of their 65 cases with postoperative lung complications showed some definite lung pathology at the time of operation. However, in a later paper, Cutler and Hunt do not lay so much stress on preoperative pulmonary lesions but find that the chief factor is embolism. The importance of preexisting sepsis is seen in a new light. Miller, Gee and Horder, Homans, Ranzi, Burnham and others have also pointed out the importance of infection in the production of postoperative pneumonias and pleurisy. The site of operation has great bearing upon the frequency of lung complications. It is generally agreed that these complications occur with greater frequency after abdominal operations, especially those upon the upper abdomen. This is well shown by Elwyn's figures from Mt. Sinai where, in 1921 and 1922, 2.76 per cent of 2,932 operative cases were followed by pneumonia, whereas 6.29 per cent of the operations upon the upper abdomen and 13.8 per cent of the operations upon the stomach were followed by pneumonia. In Armstrong's series, 27 cases of lung complications occurred in 371 cases of septic peritonitis (7 per cent). The only group that exceeded this was the 39 trephining operations in which pneumonia occurred in 20.5 per cent. He explains this high incidence by the long-continued coma which often lasted several days. Many of these head cases got very little anesthesia. Cutler in his many studies of postoperative pulmonary complications has come to the conclusion that the motility of the site of operation explains the great predilection of upper abdominal incisions to pulmonary complications. Small emboli are more apt to be set free to lodge in the lungs. The location of the

lesions in the lung further supports this theory as it coincides with the usual location of demonstrable pulmonary emboli.

It is difficult to evaluate the various predisposing factors. One author stresses one cause and another a different one, while others mention a great many factors. A positive way to get at this would be to follow the results of eliminating various factors. Unfortunately this is not always stated when good results are obtained, and very often several factors are eliminated at once. Often the data are insufficient to draw any conclusions. For instance, Herrmann suggested the use of strontium intravenously as a preventive of post-operative pneumonia. He had tried it upon ten patients. Kolodny has changed the site of hypodermoclysis from the pectoral region to the thigh, but does not give the results he has obtained. Mandl and Geist and Somberg got fewer lung complications when the patients were digitalized. Kelly, Otte, and Pfannenstiel recommend the thorough cleansing of the mouth, removing necrotic teeth and septic roots. Jackson thinks the abolishing of the cough reflex, "the watchdog of the lungs," by a too liberal pre- and postoperative use of morphine is an important factor. Boothby had a decided lowering in morbidity and mortality at the Peter Bent Brigham Hospital when the patients were kept in warm recovery rooms under the care of special nurses. Cutler and Morton state that Pfannenstiel and Otte were successful in abolishing pulmonary complications entirely by careful selection of cases, good risks, careful anesthetics by the same trained anesthetists, operations by the same group of surgeons, etc.

CONCLUSIONS

A study of the literature would seem to indicate that the term "ether pneumonia" is a misnomer. In fact anesthesia probably plays a minor rôle in the causation of postoperative lung complications except that it permits extensive operative procedures upon septic and debilitated patients. After due allowance is made for aspiration of septic material, the lighting up of a preexisting process in the lungs, the chilling of the patient on the table and before he recovers consciousness, there remain a considerable number of pneumonias and pleurisies that are best explained by septic material from the operative field lodging in immobilized lung tissue.

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MEDICAL ARTS BUILDING.

THE PATHOGENESIS OF PEMPHIGUS NEONATORUM*

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PEMPHIGUS neonatorum is an epidemic, vesicular, staphylococcic dermatitis occurring in the newborn. It is characterized by the appearance of red maculae anywhere on the body which in a few hours, become blebs filled with a clear fluid, later becoming purulent, and with a fine covering which ruptures spontaneously in a few hours, as a rule leaving a reddened weeping surface which gradually heals over and disappears without scar formation. The lesions are usually multiple and vary in size from one to several centimeters in diameter.

The disease is highly infectious and spreads through a nursery very rapidly if not prevented by immediate isolation of babies developing suspicious lesions. Adults may be affected by contact with infected babies. Thus nurses may develop lesions on the hands and arms and mothers frequently develop blebs on the breast.

Fatal cases occur and these usually are associated with lesions involving the abdomen from which infection spreads to the umbilical cord and results in a staphylococcic septicemia. Other fatal cases have so extensive an involvement of the skin, that the condition resembles an acute exfoliative dermatitis.

Epidemics occur in various institutions from the carefully regulated maternity hospital with separate pavilions for infected cases, to the general hospital where little attempt is made to separate maternity cases from patients affected by various medical and surgical conditions. Isolated cases have been noted in private homes, especially when epidemics were occurring in the hospitals of a given city (Krigbaum¹).

Tropical climates are more favorable for the development of the disease than temperate climates. Thus Clegg and Wherry² report that practically every white child born in the Manila Hospital develops pemphigus. The effect of race is shown in their report which stated that the native children were practically never affected.

In this climate the worst epidemics that we have observed have occurred in the summer time, although we have seen epidemics start in November, December and March.

There has been considerable divergence of opinion as to whether a streptococcus or a staphylococcus is the etiologic factor from a bac-

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teriologic standpoint. Sabaraud³ is of the opinion that the former is the exciting organism but he adduces no bacteriologic evidence in support of his claim. On the other hand the writer⁴ has shown that a pure culture of *Staphylococcus aureus* obtained from a lesion fulfilled all of Koch's postulates with regard to the disease. He produced a typical lesion on his own arm, and recovered the staphylococci from the experimental lesion in pure culture. This organism culturally and tinctorially was indistinguishable from a strain of staphylococcus recovered from an ordinary boil.

The isolation of this organism from all unruptured lesions, the nature of the lesions and the rapidity of spread from one baby to another in the nursery clearly demonstrates the epidemic nature of the disease. However, the origin of the epidemic in a given instance is not so easy to demonstrate.

We see, for example, an institution under competent management function for months with no evidence of pemphigus. Suddenly, a typical lesion appears on one of the babies. From this an epidemic of typical cases can start. Where does it come from? It was with the hope of throwing some light on this point that we investigated the circumstances surrounding the appearance of lesions in our nursery during the last few years.

Assuming that our bacteriologic observations have been correct, and that a *Staphylococcus aureus* causes the lesions, we must naturally consider where the source of such infection might be. Also we should try to decide whether nonpemphigus lesions such as a boil for example, can give rise to a typical pemphigus lesion, which in turn can start an epidemic?

We made several observations which convinced us that such was very probably the case. We will describe several instances which seem to point clearly to the origin of the primary cases which we have observed in the past few years. An epidemic broke out among the babies in the nursery of the County Hospital in the spring of 1920. No active cases had been seen for several months and no contacts, as far as could be traced. Several babies were infected and on investigation it was discovered that the woman who assisted the night nurse in distributing the babies for the evening and early morning nursing had marked pustular acne lesions on her back and arms. These were discovered after she herself had been delivered a few days. Her baby developed pemphigus and after isolating them both no further cases developed.

A sporadic case developed in the nursery at the University of Iowa. On investigation it was found that the interne on the service had a small boil on the back of his neck. The baby was isolated and the interne excluded from the ward and no further cases developed.

One of the instructors, demonstrating engorged breasts in a newborn baby, expressed some of the "hexenmilch." A few days later

a suppurative mastitis developed, was opened and a *Staphylococcus aureus* isolated. Within twenty-four hours a typical pemphigus lesion developed about an inch from the breast and from this lesion a *staphylococcus aureus* was found on smear and culture. Fig. 1 shows the lesion.

The converse of this was seen in the case of a young mother whose baby was born in the Chicago Lying-In Hospital during an epidemic of pemphigus. On the sixteenth day, two days after leaving the hospital, the baby developed pemphigus lesions on the abdomen and groins. Shortly thereafter the mother developed typical lesions on her breast, and a few days later developed an acute mastitis with a temperature of 102° F. Suppuration did not occur, and unfortunately no cultures of the milk were made.



Fig. 1.—Pemphigus lesion developed secondary to a suppurative mastitis.

A mother who had healing aene pustule lesions on the arms and an active herpes simplex on the lower lip, delivered normally. On the third day her baby developed a pustular lesion at the root of the nose which was diagnosed as impetigo. The next day typical pemphigus lesions appeared on the face of this baby a short distance from the original pustule. The *staphylococcus* was demonstrated in the fluid from these lesions. Our interpretation of this case is that the mother who had a *staphylococcic* dermatitis and a herpes which probably harbored the *staphylococcus*, kissed her baby and produced the impetigo lesion. Organisms from this lesion produced the pemphigus lesions on other parts of the body.

From a consideration of these cases the following conception of the pathogenesis of this disease presents itself. The *Staphylococcus*

aureus, particularly one which has been producing skin lesions, may, when coming in contact with the skin of the newborn under certain conditions, give rise to typical pemphigus lesions.

The recent literature on this subject contains two papers that suggest a similar idea. Mellon and Caldwell⁵ found pure cultures of staphylococci in the breast milk of mothers whose babies had pemphigus. Not all of these had clinical mastitis. Fractional pumpings revealed practically the same number of organisms in the separate samples indicating their presence in the deeper structures of the breast as well as in the ducts. They disregard the possibility of a pemphigus baby being the source of the breast contamination. They do not believe that pemphigus is a contact infection because the lesions in their cases developed elsewhere than on the face. They conclude that staphylococci occur in human breast milk. Changes in virulence might make them capable of starting an epidemic of pemphigus. Any strain of staphylococci might do the same thing. The fact that the organisms might have entered the breast secondary to the pemphigus seems to weaken their argument.

The cases here cited have been sporadic and were not followed by epidemics. This is probably due to several factors. The nursing personnel of our department is trained to report every suspicious lesion on a baby's skin as soon as noted. Every suspicious case is isolated for several hours for observation. A lesion that takes longer than a few hours to develop into a pemphigus bleb is not pemphigus. All blebs are painted with alcohol and opened as soon as formed and dressed with a 2 per cent white precipitate ointment. Finally an immediate search of the ward and personnel is made to discover and eliminate any possible source of staphylococcus pus contamination.

Roy E. Krigbaum studied a series of epidemics occurring in three of the Columbus, Ohio, hospitals. He found staphylococci in all cases. He was unable to infect his own skin or to transmit the infection to another part of an infected baby by rubbing it into the skin or to inoculate an uninfected baby by direct contact. He found, however, that hospitals having epidemics were using liquor cresolis compositus as antiseptic solution in the delivery rooms. On analyzing this solution it was found to be highly alkaline. He suggests that this might chemically injure the skin of the newborn sufficiently to permit the staphylococci to gain entry to the skin.

These suggestions are important as to possible contributing causes and in some instances may be the only cause acting. We believe, however, that in all probability staphylococci derived from other skin lesions such as acne or boils are more commonly the source of these epidemics and should be searched for and eliminated as a possibility in every epidemic. The older literature on the treatment of this disease confines itself almost exclusively to the care of the lesion in active

cases, the importance of isolation of the infected cases, and sanitary measures for combating reinfection from the wards, bed linen, and nursery equipment. The important point of the original source of the epidemic was completely overlooked and, therefore, the liability of reinfection from the same or similar source is obvious.

CONCLUSIONS

The following conclusions seemed justified from consideration of this data:

1. Epidemics of pemphigus neonatorum arise in babies who have not as far as can be demonstrated come in contact with other cases of pemphigus.

2. The lesions of pemphigus neonatorum are constantly found to contain a *Staphylococcus aureus* which fulfills all of Koch's laws with respect to this disease.

3. Culturally and tinctorially these staphylococci are indistinguishable from other strains of staphylococci isolated from other skin lesions.

4. Other skin lesions due to the *Staphylococcus aureus* are frequently found in connection with primary cases in an epidemic of pemphigus.

5. It is probable that *Staphylococcus aureus* from lesions other than pemphigus may produce typical pemphigus lesions and be the starting point in an epidemic of this disease.

6. On the appearance of a sporadic case in a maternity active search should immediately be instituted for skin lesions among the attendants and any suspicious carriers excluded from the nursery.

7. No individual having an active pustular skin lesion should be allowed in a nursery or to come in contact with nursery linen.

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CAN QUININE KILL THE FETUS IN UTERO?

BY GEORGE GELLHORN, M.D., F.A.C.S., ST. LOUIS, MO.

(From the Department of Gynecology and Obstetrics, St. Louis University School of Medicine, and St. Mary's Hospital)

THE intensifying effect of quinine upon uterine contractions in labor was first observed in 1872.¹ Its use, usually with castor oil, for the purpose of inducing contractions is of much more recent date, and when Watson² proposed a definite formula for this combined medication, and Williams³ endorsed the recommendation, the problem of safely inducing labor near term seemed to be solved. By this method, nothing could be lost and everything was to be gained. It was true that only in about 50 per cent of the cases was the attempt at starting contractions successful, but, on the other hand, no harm could come from it. I myself have told many a patient that the medication "if it did not help, would not hurt her."

Nor was there anything in literature to indicate otherwise. It was long known, of course, that in malarial countries abortions occurred very frequently, and this was attributed to the use of quinine. But this explanation is unconvincing. The disease itself may readily lead to interruption of gestation, and scientific investigators who, like Koehler,⁴ approached the subject experimentally, emphatically deny that quinine is an abortifacient. In the two or three cases of malaria in pregnancy which I have encountered, I have administered quinine unhesitatingly and thereby, I believe, *averted* abortion.

However, the present discussion deals with the use of quinine at the end of pregnancy and here, too, the drug was absolved of any untoward by-effects. The only criticism DeLee⁵ had to offer, was that it might lead to precipitate birth. Schwab⁶ stressed the fact that quinine intensified contractions without making them tetanic. Hammond⁷ gave 10 grains of quinine every half hour in the second stage until 30 grains had been taken, and observed stronger contractions but never any ill effects. Mäurer⁸ administered 15 grains at a dose and gave up to 45 grains within twelve hours, and in some cases even more, without noticing any untoward influence on the child. The experiences of Marek⁹ and Fülöp¹⁰ can, likewise, be summarized in that quinine was not harmful to either mother or child. Bennett¹¹ used quinine in two cases of albuminuria with excessive edema. In the first case, convulsions occurred in the eighth month. Quinine was given in doses of 8 grains every four hours for twenty-four hours, in all six times. The second patient received 5 grains of quinine three times a day. *Both children were stillborn*, but it would obviously be too far fetched to connect the fetal death with anything but the toxemia.

In the entire, very voluminous literature on quinine in labor, I have been unable to find a single, clear-cut statement that the drug could affect the child in any way. Porak¹² seems to have been the only one who expressed a different opinion. He claimed that, after ingestion of quinine, the amniotic fluid is often found discolored and many children are born asphyxiated. Such children, if resuscitated, fail to nurse well. Guggisberg¹³ challenges the correctness of these observations. His own studies have convinced him that the fetal heartbeats are never slowed down by quinine and that neither during nor after delivery need there be any fear for the well-being of the child.

In fact, there seems to be a remarkable tolerance on the part of the child even for large doses of quinine. Bailey,¹⁴ for instance, gave 40 grains with perfect impunity.

If such unanimous optimism had created in me a sense of security, I was bound to be rudely awakened by the following experience.

On May 12, 1922, I delivered successfully a primipara of 27 years by means of cesarean section for placenta previa. After about three years of perfect well-being, the patient conceived again; the last menstruation occurred on Jan. 26, 1925. In the second month of this pregnancy, she suffered from an attack of hyperemesis which yielded promptly to appropriate treatment in the hospital. The remainder of the pregnancy was normal in every respect.

The child was apparently quite large, and as I wanted to prevent any undue strain on the uterine scar and avoid, if possible, a second cesarean section, I advised induction of labor two weeks ahead of full term. Consequently, on Oct. 28, 1925, the patient took four tablespoonfuls of castor oil at 7 A.M., and 10 grains of quinine at nine, eleven, and one o'clock, respectively, in all, 30 grains. *No contractions ensued.* The patient felt some ringing in the ears, but this soon passed off. The child seemed to be a little more lively at first, but towards evening all fetal movements ceased, and at no time during the following two and one-half weeks could the patient feel any motion. Nor was I able, in almost daily auscultations, to hear the fetal heartbeats.

Other signs of fetal death soon put in appearance. The abdomen became perceptibly smaller. The patient, heretofore the picture of splendid health and strength, felt nauseated for several days. Then, again, she was extremely tired, and later she had a complete loss of appetite. In the last day or two she also had a feeling of a heavy body within her abdomen, falling from side to side as she moved her position in bed, and experienced a number of "nervous chills." Objectively, temperature, pulse, and blood count were always normal, but her weight decreased by a few pounds and there was a trace of acetone in the urine. However, as there were no urgent indications, it seemed wise to postpone any intervention until the uterus should show a disposition towards ridding itself of the dead child. This did not happen until Nov. 12, that is, 15 days after the supposed death of the fetus, when the patient reported that she had some very dark discharge which was accompanied by a few cramps. A small Voorhees bag was then inserted through the closed cervix and a weight of one pound attached. Strong contractions occurred quite promptly but ceased as soon as the bag was expelled seven hours later. The uterus remained quiescent for more than twenty-four hours. Then strong contractions set in. After five hours of labor, the dilatation was found almost complete, though there was no entire effacement; both the internal and the external os could be felt, and the length of the cervical canal was about one-half an inch. The membranes had ruptured previously. A thick-walled sac protruded from the cervix and filled the upper part of the vagina. Within the sac, one of the occipital bones could be felt above the pelvic rim.

The patient was now placed on the delivery bed and, after careful disinfection, the narrow vagina was "ironed out" to admit the whole hand. The thick sac was recognized to be the scalp which had separated from the cranial bones and was filled with liquefied or softened brain substance. There followed a technically difficult extraction of the head by pull on the bones with vulsella. The broad shoulders resisted traction until both clavicles had been cut. The rest of the body followed easily. Much dark bloody discharge of an unpleasant odor escaped through tears and rents in the scalp.

The placenta was adherent and had to be removed manually. During this procedure, the scar of the cesarean section in the lower uterine segment could well be palpated; it was *strong and linear*. Pituitrin and ernutin were injected under the skin, and the uterus contracted readily with practically no loss of blood. There was no perineal laceration, and the patient was returned to her bed in a very good condition.

A most careful examination of the dead child and the placenta failed to show any cause of the death in utero nor did a postmortem of the fetus throw any light on the etiology of the accident.

The mother passed through an afebrile puerperium but required several months before she regained her former good health. The Wassermann test was negative.

Under these circumstances one is forced to conclude that the death of the child and the ingestion of quinine were not a mere coincidence, but that one resulted from the other. I am unable to explain the mechanism of this relationship at the present time. There are, however, animal experiments under way in my department for the purpose of studying more fully the effect of quinine upon the fetus in utero. Quinine, says Kobert,¹⁵ is a typical protoplasmic poison which, in large doses, first paralyzes and then destroys all cells of the body. In the few fatal cases, however, enormous doses of between two and four teaspoonfuls had been taken. Kobert, too, though he touches on the subject of quinine in pregnancy, fails to record any deleterious effect on the fetus.

Yet, my case, though it seems to be the first reported in literature, is surely not the only one. When I narrated my experience in a small circle of friends a short time ago, two similar cases were mentioned in the conversation. I am deeply indebted to Dr. Joseph L. Baer, of the Michael Reese Hospital in Chicago, for permission to include in this report an analogous case observed by him. To Dr. Frank W. Lynch, of San Francisco, I am under great obligation for giving me the record of a case observed by him in the University of California Hospital. His patient was a iii-para of twenty-seven years in whom labor was to be induced very near term. Her Wassermann test was negative. On August 9, 1917, she received two tablespoonfuls of castor oil with 10 grains of quinine, and the quinine was repeated thirty minutes later. As no result occurred, the entire procedure was repeated on August 12 and again on August 14. No contractions ensued. On August 22, the entry shows that the patient had not felt life for several days and that the fetal heartbeats could not be heard. She was discharged at her own request and later delivered of a stillborn child by

a private physician. Dr. Lynch writes: "This is the only case in which we have given so much quinine here in so short a time, although we gave as much in Baltimore in the treatment of malaria without interrupting pregnancy or causing fetal death. * * * Our present rule is never to give two so-called 'cocktails' (castor oil with quinine) in the same week."

It will be seen that in this instance the amount of quinine employed in one day, was even less than in my own case.

It seems highly significant to me that here, without any special effort, three instances of fetal death probably due to quinine could be collected, although none had ever been recorded in the literature. It would be most desirable if similar experiences be reported so that one may gain an insight into the untoward complications that may result from the use of quinine for induction of labor.

SUMMARY

1. The popular method of induction of labor by means of castor oil and quinine is, according to the literature, an entirely harmless procedure which threatens no danger to either mother or child.

2. A personal experience is recorded where the usual dose of quinine was followed by intrauterine death of the child. The latter was expelled in a macerated condition seventeen days after castor oil and quinine had been administered for the induction of labor.

3. No cause for the fetal death could be detected by a thorough examination of the mother, the child, and the placenta.

4. The signs of intrauterine death occurred so promptly after the ingestion of quinine that a causal relationship between the two must be assumed.

5. Two analogous cases have been communicated to the writer by other observers. It seems, therefore, probable that similar accidents have occurred to others without finding their way into print. It would be highly desirable if physicians would report such experiences so that the possible dangers of the medication can be duly appraised. At any rate, it seems justifiable to sound a note of warning against the indiscriminate and copious use of quinine for induction of labor.

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METROPOLITAN BUILDING.

REPORT OF A CASE OF UMBILICAL CORD COILED FIVE TIMES AROUND INFANT'S NECK*

BY WALKER GOSSETT, M.D., LOUISVILLE, KY.

IN THIS report the term "coiled," instead of "looped," is used advisedly, since "a loop in the cord is a sling over a part of the fetus, while a coil must completely encircle a part of the fetus." The latter was the condition in the case here described.

It may be interesting to note that formerly the fetus seldom survived this accident, which induced the absurd belief among earlier writers that coiling of the funis around the neck represented "*suicidium fetus in utero*."

Mrs. R., aged twenty-four, para ii, was delivered of a girl baby weighing six pounds at the Saint Joseph Infirmary, Sept. 3, 1926. When the head was extruded, and the coiled cord noted the anesthetist was requested to give the mother oxygen. There was no pulsation in the cord. The baby was quickly delivered, suspended by its feet, and the cord rapidly uncoiled from about its neck. There were five distinct coils. The cord measured forty inches in length and contained many spiral twists resembling a corkscrew. These twists were not counted. The baby revived very quickly after uncoiling the cord, without artificial means of resuscitation except oxygen administered to the mother.

I have never, during thirty years of obstetrical practice, before seen more than three coils of the funis around the child's neck. In the case reported the coils were not tightly drawn and the cord was small in diameter, being about the size of an ordinary lead pencil.

The frequency with which the cord has been found encircling the neck of the child is variously stated by different authors. In 2200 cases Edgar noted the cord about the neck in 514, or 23.36 per cent. Other writers show the percentage as from 25 to 33. In statistics mentioned by Gardiner, embracing 35,712 cases observed by seven prominent obstetricians, coiling of the cord occurred once in every 5.5 births, and once in every 9.2 births it encircled the neck of the child.

The number of coils noted around the neck varies from a minimum of one to a maximum of nine. Instances are rare, however, in which more than three coils have been found. In Edgar's series it was coiled once around the neck in 19.77 per cent, twice in 3.18 per cent, and three times in 0.40 per cent. The same author states that he had a case in his own practice in which the cord was coiled seven times around the neck causing death of the child, and refers to another in which there were nine coils around the neck.

BROWN BUILDING.

*Reported to the Louisville Obstetrical Society, Louisville, Kentucky, Sept. 27, 1926.

A CASE OF RUPTURED UTERUS DURING THE SECOND LABOR AFTER CESAREAN SECTION

BY P. E. THORNHILL, M.D., WATERTOWN, N. Y.

IN CONNECTION with a discussion of ruptured uteri, the following case is interesting because the scar withstood one very hard labor, only to rupture with the first pains of the succeeding one.

Age twenty, para iii, gravida iv, general health always good. Menstruations regular and normal. Married at sixteen.

First pregnancy, 1921, developed eclampsia in ninth month; classical cesarean by another surgeon; good recovery of both patients; no wound infection, and the nephritis seemed to entirely clear.

Second pregnancy, 1922, closely supervised at clinic, blood pressure and urine normal throughout. No weakness in the scar being evident and the child being in normal position with no disproportion, it was decided to allow her a test of normal labor. Her measurements were, interspinous 22.5; intereristal 27.5; external conjugate 20; bischial 9; and the diagonal conjugate not reached by an average finger. The membranes ruptured early. The pains were of good quality, there was no perceptible bulging of the scar, and no abnormal pain. The first stage was twenty-two hours in length, and she was allowed two hours in the second stage before midforceps were applied for arrested progress and exhaustion. The baby weighed nine pounds. Good recovery of both patients.

Third pregnancy, terminated in an abortion in the second or third month. I did not attend her during this illness and the cause of the accident cannot be determined. There appears to have been no infection, and recovery was prompt.

Fourth pregnancy, normal throughout except for considerable vomiting in the early months, and constipation. She attended clinic regularly. Date of expectancy was July 25, 1925.

The rupture occurred on July 8. For two days previous to this, she had had diarrhea of unknown origin. On this particular afternoon, she had walked a distance of two miles. Pains began about 6:30 P.M., moderately sharp. In an hour they became intense and she began vomiting. I saw her about 8 P.M.; she was evidently in great pain, attempting to vomit every two or three minutes, and pale but not perspiring. The abdominal muscles were not rigid, but she was very tender and the fundus could not be defined. The fetal head could be palpated floating above the pelvic brim; the fetal heart was not heard. There was no vaginal bleeding when first seen, but a little appeared later. The pulse was 100.

The first impression was that it was nothing serious, probably just an acute gastritis; but a little reflection upon the history and upon the condition of that fundus, together with a few minutes' observation of an increasing pulse rate, clamminess of skin, and beginning perspiration, shortly led to correct diagnosis, and we moved her to the hospital.

After preparation, a careful vaginal examination disclosed a slight bloody discharge, the cervix high and tightly closed, and the presenting part too high to be palpated. The hemoglobin was 75 per cent; reds, 3,200,000; blood pressure 132/80. Blood typing was done and a donor secured.

The abdomen was opened at about 10:30 P.M., through a low median incision. The peritoneal cavity was full of blood, and the child and placenta, in unruptured

membranes, were outside the uterus. Incision of the membranes over the child's head allowed the first fluid to escape. The fetal heart had ceased and efforts at resuscitation were unavailing. The child's weight was eight pounds two ounces.

The uterus showed a large three-cornered rent in the uppermost part of the fundus where there was a small band of omental adhesions. There were no extensive adhesions present. As repair seemed impossible, a hysterectomy was done. Saline by hypodermoclysis was given on the table, but transfusion seemed unnecessary.

On the following day, the hemoglobin was 40 per cent; reds 2,208,000; whites 9,300; polynuclears 77 per cent. The patient made a prompt recovery and is now in excellent health.

Why did the scar rupture with the first pains of this labor, instead of breaking with the hard second-stage pains of the previous one? Was it placental erosion this time that thinned and weakened the scar?

634 WOOLWORTH BUILDING.

AN OBSTETRIC TAMPON

BY ALEXANDER M. CAMPBELL, M.D., F.A.C.S., GRAND RAPIDS, MICHIGAN

(From the Grand Rapids Clinic)

THE hall-mark of an obstetrician is the proper restoration of a badly injured birth canal, and in practically every case such injury should be repaired at the time it is sustained. In order to effect such a restoration one should be familiar with the surgical anatomy of the injured structures and be equipped with all the paraphernalia necessary to properly visualize and repair the lacerated parts and to

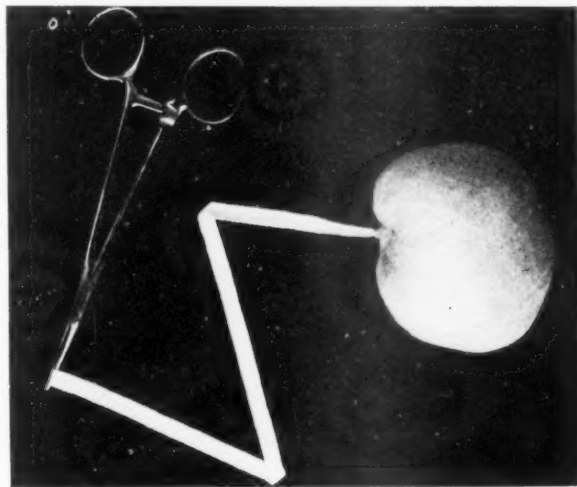


Fig. 1.

work in a comparatively bloodless field. Assuming that the operator has the adequate instruments such as, specula, hemostats, retractors, needles, suture materials and a proper light focused upon the operative site, he will find the "obstetric tampon" which we devised several years ago to be a valuable even though simple device.

The tampon which is made by our surgical nurse is about the size and shape of a tangerine orange and consists of absorbent cotton compressed rather solidly and covered with gauze. Attached to the center of the "hilus" of the tampon is a strip of strong tape one-half inch wide and twelve inches long. These tampons are done up in packages of from four to six and are sterilized.

As soon as the second stage of labor is completed and while the patient is still under anesthesia one tampon or more is inserted into the vagina thereby occluding the canal, damming back the blood and making it possible to visualize the amount of injury that is sustained to all parts of the vaginal wall. With proper light and specula every portion of the vaginal canal distal to the tampon can be readily visualized; and all injuries can be repaired in a bloodless field with accuracy and with a minimum loss of time.

When repair has been accomplished the tampons are withdrawn and by that time the placenta is usually separated sufficiently so that the third stage of labor may continue uninterruptedly or with gentle assistance.

The use of the obstetric tampon avoids the accident of leaving loose sponges in the vagina during inspection and repair of parturitional injuries because the nurse is instructed to place a hemostat on the distal end of the tape before placing the tampon in the operator's hands, and after insertion of tampon the hemostat with tape attached is placed upon the patient's abdomen.

The Readers' Forum

CONDUCTED BY JOHN OSBORN POLAK, M.D.

A New Department

IT is proposed to begin in the July number of the Journal a new department, THE READERS' FORUM, devoted to the problems of the practitioner of medicine in obstetrics and gynecology. Questions are solicited for reply and discussion from our readers, likewise criticism or comment on any original communication previously published in the Journal.

The Editors have instituted this venture in response to a popular demand and trust that readers of the Journal will avail themselves of the service offered.

The Department will be conducted by DR. JOHN OSBORN POLAK, and communications intended for the FORUM should be addressed to him at 20 Livingston Street, Brooklyn, N. Y.

Department of Maternal Welfare

CONDUCTED BY FRED L. ADAIR, M.D.

REPORT OF THE COMMITTEE ON MATERNAL WELFARE TO THE THIRTY-NINTH ANNUAL MEETING OF THE AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS AND ABDOMINAL SURGEONS

BY GEORGE CLARK MOSHER, M.D., KANSAS CITY, MO.

NO PRONOUNCED developments have been marked during the current year in Maternal Welfare activities. Members of the committee have addressed meetings of the Cleveland Academy of Medicine, the Toledo Academy of Medicine, and the Wayne County Medical Society at Detroit, and also the Ohio and Kansas State Medical Societies. A large number of invitations from the secretaries of the county societies throughout our assigned section of the states have been accepted, and satisfactory talks made on phases of the subject. It has been impossible to meet all demands; one, in particular, of the West Virginia State Society, being regretfully declined on account of other engagements conflicting with the date.

The state chairmen, in the majority of instances, have done excellent work in furnishing speakers, when requested. All reports from the states have not been received, but among those that have reported several are deserving of special mention. Dr. Geo. VanAmber Brown, of Michigan, has personally done most effective work in various parts of his state. Dr. John D. Clark, of Kansas, has himself addressed on Maternal Welfare, seventeen County Societies, which, through the system adopted in 1925, sent a request for a speaker to the secretary of the state medical society.

In the volume of unprejudiced mortality statistics, received in July, 1926, from Dr. Wm. H. Davis, Chief Statistician of the Census Bureau, the unquestioned authority in this country, some most interesting and suggestive statistics occur. These shed a light on the value of published figures, which have been so often quoted to the discredit of American maternal mortality in comparison with that of foreign countries. For instance, the census report shows that for 1915 and 1923 the death rate in the United States from puerperal septicemia was identical. For the same period England and Wales show a reduction of 13.3, Australia an increase of 30.8, and New Zealand an increase of 137.5. Other puerperal causes in the United States show an increased mortality of 5.4, while Australia has an increase of 17.2 per cent, England and Wales, however, a decrease of 7.4 and New Zealand a decrease of 15.4 per cent. All this goes to show that, while figures may be arranged to prove, they may also be juggled to disprove any contention. So while the melancholy phrase "Maternal Mortality of the United States has not changed in so and so many years" can still be kept in type as expressing the fact, it must be understood that the enormous increase of the death rate in the antipodes is evidence of discrepancy in the accuracy, either of the mortality of 1923, or that of 1913. Nobody can believe that an increase of 137 per cent in New Zealand can

represent the facts. Also, as Dr. Davis points out, the classification of deaths from puerperal causes differs greatly in different countries, so that higher rates of death do not necessarily mean a greater mortality.

The census report gives to Italy a total puerperal mortality of 40 per 10,000 births, with a puerperal sepsis of 16 per 10,000 births. It is apparent that as compared with these figures, and those of Denmark, whose Midwife Commission was inaugurated in 1714, and England since the passage of the Midwife Act in 1902, our maternal statistics, which still stand 68 to the 10,000 births, are woefully excessive.

This is the situation not only in the United States, where, as the Secretary of the Health Department of North Carolina points out, a quarter of a million of women in the rural districts of the south are still delivered by the 50,000 untrained, unregistered, ignorant, negro midwives, but also in Canada where there are practically no midwives. Denmark has 1100 midwives, all registered and under control of the Health Department. This is in a country of three and one-half million people, with a birth rate annually of 75,000. Her maternal death rate is 10 to the 10,000 births, from sepsis, and 17.5 mortality from all puerperal causes, while we have nearly 70 in the aggregate, with a maximum of 160 and a minimum of 30.

According to the Census Bureau we have an estimated population of 110,000,000 with an annual birth rate of 2,500,000.

It is to be borne in mind that our crude and adjusted rates in the United States include the colored race which still shows a total mortality of 111, a puerperal sepsis of 38 and death from other puerperal causes of 73, or nearly double that of the white mothers included in the calculations. This represents a condition, not a theory, as Grover Cleveland said, speaking on another subject, but it must be reckoned with.

Among the cities of 100,000 in the birth registration area, the highest rate from all puerperal causes, 1920 to 1923, appear from Norfolk 130, from Kansas City, Kansas 114; Cincinnati 109 and Omaha 108, as against the lowest, Fall River 30, Oakland 36, and New Bedford 49 per 10,000 births.

The census report shows a mortality from 1923 in which the extremes were even more marked. For instance the relative rank for adjusted rate for puerperal sepsis among the cities shows Spokane highest with a mortality of 168, while deaths from puerperal sepsis show Oakland the lowest with 25. Birmingham had the highest rate from all other causes, 184, while Spokane had the lowest, 28. Throughout the United States the rates for both white and colored mothers both for puerperal sepsis and all puerperal causes are lower in rural than in urban communities.

Dr. J. E. Davis has stated that if every state had good birth and death registration since 1920, it would be shown that puerperal causes of death are decreasing as a menace to the women of the United States. The birth registration area was not established until 1915, and then included but ten states. It now includes thirty-eight states with approximately 90 per cent of the population of the country, but the lax registration of births adds greatly to the high maternal rates because of their inaccuracy.

So there is a gleam of hope that our mortality statistics based on facts will be measurably reduced if we keep up the propaganda on three points: first, education in asepsis and obstetric technic; second, in urging our patients to apply for prenatal care, early in their pregnancy, both in the charity cases and in private practice; and third, an honest, prompt and automatic reporting of all births to the Census Bureau.

Society Transactions

THE AMERICAN ASSOCIATION OF OBSTETRICIANS,
GYNECOLOGISTS, AND ABDOMINAL SURGEONS

THIRTY-NINTH ANNUAL MEETING

CHICAGO, ILL., SEPTEMBER 20, 21, 22, 1926

THE PRESIDENT, DR. GEORGE CLARK MOSHER, OF KANSAS CITY, IN THE
CHAIR

Monday, September 20, 1926

Evening Session

DR. CHARLES L. BONIFIELD, Cincinnati, Ohio, read a paper on **Tuberculous Peritonitis**. (For original article see the current volume of the Transactions of the Association.)

A paper on **The Transverse Excision of the Fundus Uteri with Ovarian Conservation**, by PROF. OSCAR BEUTTNER, University of Geneva, Switzerland, was read by the Secretary. (For original article see page 512.)

DISCUSSION

DR. JOHN OSBORN POLAK, BROOKLYN, N. Y.—In 1910, in Geneva, I saw Prof. Buettner do this operation. In 1912, I reported twenty cases before the American Medical Association. The reason we favored this new form of resection of the uterus was because of a suggestion by Dr. Howard A. Kelly, who called my attention to the fact that if the ovary was left the uterus should be retained for the mucosa of the uterus contained some hormone that modified the secretion of the ovaries. The only modification which we made was in the technic. We felt that in a large number of young women who had double pus tubes it was unfair to do what we had been previously doing, that is, a hysterectomy with attempts to save an ovary which only had a short life. It has been my misfortune perhaps more than any one else's to have to take out a number of conserved ovaries. I have removed 71 ovaries in a series of 400 cases where we had conserved the ovary at a previous procedure.

Stimulated, therefore, by Dr. Kelly's suggestion and seeing Dr. Buettner's technic, we published the article in 1912. We have been using this technic for a considerable length of time and believe that in the young woman with infected tubes, the great advantage is, as was shown by my associate Dr. Beck, in a microscopic study presented at the time, that infection from the tubes spreads into the muscularis to a considerable extent, so if we removed the tube alone, leaving the uterus, we not infrequently left a large infected uterus; while by transverse cuneiform resection we could remove the entire area of infection. We showed at that time that the inflammatory reaction existed a considerable distance beyond the actual tubal involvement.

Therefore, it not only had the advantage of maintaining menstrual function, but preserved ovarian secretion; and also in doing it with this technic if care is used one is able to maintain the circulation of the ovary.

DR. CHARLES L. BONIFIELD, CINCINNATI, OHIO.—I agree with Dr. Polak that the ovary thrives better if the uterus be left with it; its circulation is much better. To me, however, it does not seem absolutely necessary, in operating for inflammatory conditions, to remove all the inflamed tissue. If you remove the infection from a fallopian tube the inflammation around it subsides. Formerly in removing infected tubes I often left a little stump of the tube. I learned that that stump was often infected and kept infecting and reinfesting the endometrium. One could curette the uterus but he could not curette these stumps and they often caused a disagreeable leucorrhea for a number of years. I now, therefore, dissect the tube out of the horn, closing the wound as I sew up the broad ligament and covering it with a fold of the round ligament. My results with this operation have been quite satisfactory and, therefore, I see no reason for cutting clear across the fundus of the uterus.

DR. THOMAS B. NOBLE, Indianapolis, Ind., read a paper on **The Operative Treatment of Abdominal and Pelvic Tuberculosis**. (For original article see the current volume of the Transactions of the Association.)

Tuesday, September 21, 1926

Morning Session

DR. LAWRENCE M. RANDALL, Rochester, Minn., read (by invitation) a paper on **Lipiodol Radiograms in the Diagnosis of Sterility**. (For original article see page 457.)

DISCUSSION

DR. OTTO H. SCHWARZ, ST. LOUIS, MO.—Dr. Newell, of St. Louis, has pictures that are practically identical with those of Dr. Randall's. They are published in the AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY (vol. xii, p. 189).

DR. WM. A. COVENTRY, DULUTH, MINN.—How long after the lipiodol injection was the patient operated upon? You have only operated upon one patient within a few days of your injection. I should like to know whether any evidence of irritation or residue of lipiodol material was found?

DR. JOHN N. BELL, DETROIT, MICH.—Dr. Randall, in his remarks, stated that they observed no irritation of the peritoneum where the lipiodin had escaped into the peritoneal cavity. That is very interesting and significant because of the possibility of our treating tuberculous peritonitis in this manner. If it does not irritate the peritoneal cavity, why not give it a trial? So often tuberculous peritonitis apparently begins around the tubes, and it would be a very simple matter to use it as a therapeutic measure in tubercular peritonitis.

DR. JAMES E. DAVIS, DETROIT, MICH.—It must be recognized by all that a method which will contribute so materially to the understanding of the gross pathology of tissues before they are removed from the body is exceedingly valuable. When such pictures can be obtained, the pathology is so easily read, that we must recognize that this diagnostic method is a distinct advance.

The majority of the cases distinctly belonged in the group of malformations sug-

gesting potential pathologic conditions. A number of the pictures of the tubes gave us the exact data required for the diagnosis of the primitive type of oviduct. Of course, many showed also acquired malformations through infection, but these cases of primitively twisted oviducts are just the ones that are exceedingly difficult to examine and to diagnose.

DR. JAMES N. WEST, NEW YORK CITY.—I would like to say something about the results of operation where both tubes are closed.

About 1906, Dr. Wm. M. Polk read a paper before the New York Obstetrical Society advocating operation upon patients for sterility who apparently had closed tubes. There was no method of physical investigation that would show positively this condition such as we have today in the method described and a number of men took up that question. Dr. A. P. Dudley, Professor at the Post-Graduate Hospital did a number of such operations. I also removed both tubes or sections of both tubes, for sterility in about thirty-five cases. We were able to follow up most of them in order to see the results obtained. Four of my patients had children. I think if any of the others had children they would have reported in all probability. One woman had three children, one had two, and two had one each. The others apparently remained sterile.

There were some interesting results following these operations. A plastic operation united the peritoneum to the mucous membrane much in the way you bring the skin to the mucous membrane in a phimosis operation, and the ends of the tubes were wiped out with alcohol and the wound closed without drainage. All of the cases referred to were cases in which there was absolute closure of both tubes, usually at the fimbriated extremity. Following there was one case of ectopic gestation. There were three cases of intestinal obstruction in the course of a few years. Two of these were in bad condition with general peritonitis when first seen and we were able to relieve the obstruction by severing bands and breaking up the adhesions; the third patient died. The obstruction in the last case was rather far advanced and the patient did not improve after the operation, only lived about forty-eight hours. In several other cases I was compelled to operate again and I found those tubes surrounded at the ends with adhesions and again closed and with the intestine plastered down over the end of the tubes. The first of the intestinal obstructions did not occur until about eighteen months, some three years after the operation. There was no primary mortality in these cases. They all made almost uninterrupted recovery, but there were bad consequences later on in several of them so that they had to be reoperated upon for intestinal obstruction and tubal pregnancy. We had several living children as the result.

As a result I felt discouraged about resecting the tubes for sterility in healthy women who had a tubal disease which practically subsided and were then complaining of no symptoms. Of course, it is an intensely personal thing with the patient concerned and we as surgeons cannot decide for them but can only tell them what the chances are. If I found, by any method described here, both tubes closed, I would advise a healthy woman who was not suffering, not to have an operation.

DR. RANDALL (closing).—Dr. Wetherell's point about infected cervixes is well taken. In making the statement that the lipiodol injection is not done if there are any contraindications to the Rubin test, I felt that it was obvious that the condition of the cervical canal is taken into consideration. We do not consider that the lipiodol injection should be used as a substitute for the Rubin test and we feel that inflation should always precede. The method should be confined to hospital work; it is not an office procedure in any sense of the word.

Lipiodol in large amounts no doubt would be irritating to the peritoneal cavity. In these patients, the average amount of the solution used is 5 to 6 c.c., the most of which occupies the uterine cavity. Practically all of this escapes back through the

cervix following removal of the cannula. Consequently, there is a very small amount of lipiodol remaining in the pelvis and the element of irritation seems minimal.

Referring to Dr. West's statement, we do not urge operation of these patients. A sterile woman is usually ready to take any chance, reasonable or unreasonable, to overcome her complaint and if a reasonable chance does exist we should do our utmost to make as accurate preoperative diagnosis as possible. We discourage a great many women from operative treatment for sterility, in fact we are inclined to be very conservative in this regard. Following salpingostomy or any plastic surgery on the tubes, no doubt closure from adhesions does occur. Frequently, the tubes will remain patent long enough for pregnancy to supervene.

My impression is that the incidence of male potency or sterility is higher than 10 per cent. If I remember correctly, our figures run between 20 and 25 per cent.

Dr. Davis has mentioned congenital malformations in the internal genitalia in women and I believe that lipiodol will afford us a great deal of information concerning a condition about which we know little.

DRS. O. H. SCHWARZ AND W. J. DIECKMANN, St. Louis, Mo., presented a paper on Puerperal Infection Due to Anaerobic Streptococci. (For original article see page 467.)

DR. PALMER FINDLEY, Omaha, Neb., read a paper on Biologic Defense in Puerperal Infection. (For original article see page 514.)

DISCUSSION

DR. W. J. DIECKMANN, St. Louis, Mo. (Guest).—With regard to puerperal infection, I think our results demonstrate that in a clean obstetric service, infections due to hemolytic streptococci are rare. Furthermore, we are reporting the infections which occurred in 2000 deliveries and you will note that comparatively few cases were due to aerobic organisms; these patients in great part were delivered at home with questionable methods. The great preponderance of anaerobic streptococci found by us, although routine cultures were always made for aerobic organisms, gives support to the autoinfection theory. Despite the fact that anaerobic streptococci have been recovered repeatedly from the vagina of both pregnant and nonpregnant women, and granting that autoinfections do occur, we believe that a number of these infections could have been prevented. For example, we found that long, dry labors with the head not engaged were particularly subject to infection by these organisms irrespective of the type of examination, i.e., rectal or vaginal. Personally, I believe that some type of vaginal sterilization, for example, the injection of from 5 to 10 c.c. of a 5 or 10 per cent mercurochrome before vaginal or rectal examination would prevent a considerable number of infections. A well contracted uterus during the early puerperium would offer a less favorable environment.

One ought not wait until a patient is moribund before getting cultures and instituting treatment. Although you deliver your patients with all the aseptic principles known, regard and treat those with a temperature as cases of puerperal infection instead of suspecting pyelitis, malaria, mastitis, etc., and finally, when your patient is moribund, by exclusion conclude that she has a puerperal infection. We have found that the prophylaxis of pelvic thrombophlebitis with its mortality of 80 per cent or higher, by uterine culture and douche, thus insuring proper uterine drainage, is less difficult and more certain than the cure.

As to the treatment of pelvic thrombophlebitis, we feel at present that ligation should be considered. The otolaryngologist ligates the external jugular in mastoid infections with very good success; but it must be done early. Of course, if you ligate

the veins of all patients with a pelvic thrombophlebitis, a considerable number will be ligated in whom it was unnecessary. If you have cultures, however, and ligate those patients with the phlebitis due to anaerobic streptococci with marked proteolytic powers, you will save a number of patients who will die without the operation.

The blood cultures must be taken during or immediately after a chill, or at the height of the temperature. In a case of endocarditis due to the *Streptococcus viridans*, positive cultures can be obtained almost any time; but in cases of pelvic thrombophlebitis the cultures are usually positive only at the time mentioned above.

DR. PERCY W. TOOMBS, MEMPHIS, TENN.—I have been able to demonstrate the presence of the so-called *Streptococcus putridus* in one case only. The clinical picture and the physical findings were as those described by Dr. Schwarz, but the treatment instituted differs somewhat from that described. A bacteriophage was made and 2 c.c. injected on alternate days. I have not yet been able to determine just what effect the bacteriophage has upon the patient, but I do know there is a marked recession in temperature, the blood is improved and the patient has a sense of well-being following its administration. We further treated this patient with transfusion of blood,—600 c.c. on alternate days. Toward the end of her illness she developed acute endocarditis which has since cleared up.

I would like to emphasize the early recognition and prompt treatment in those cases which we have heretofore passed by as simple sapremias. A thorough examination, uterine and blood culture will probably reveal that we are dealing with just such cases as Dr. Schwarz has described.

As Dr. Schwarz reports but four cases I would rather defer an expression as to the advisability of ligation of the pelvic veins until he can give us some definite symptoms upon which we may base our conclusions that operative measures are indicated.

I do not use the curette nor do I believe intrauterine irrigations are indicated in these cases.

DR. GEO. F. PENDLETON, KANSAS CITY, MO.—As to sepsis in general one needs a bacteria, a channel, and a fertile field for bacterial growth. This field is generally in the pelvic veins, occasionally in the uterine wall and adnexa and but seldom in the peritoneum. As Doctor Findley has shown, a cure depends upon the body resistance and reaction around the focus of infection. Surgically we all worry about peritonitis. Obstetrically peritonitis is not the rule. Thrombophlebitis is the common septic process. Doctor Schwarz' slides showing the infected thrombi in the veins illustrated the futility of using the so-called bactericidal solutions intravenously with the purpose of reaching infective foci in veins completely closed. Mentioning mercurochrome brings up the same old argument. I think we get results occasionally from mercurochrome injections. I doubt its bactericidal action when diluted in blood. I consider its action somewhat the same as our modern conception of arsenic in treating syphilis which is not spirocheticidal in the blood solution but acts fundamentally upon each individual body cell, stirring up its production of immunizing bodies and thereby increasing the general body reaction against that infection; in other words, increasing the mass action of body resistance which Doctor Findley has just mentioned. Blood transfusions do the same thing, building up quickly and maintaining body resistance. To get at a late thrombophlebitis we have no other definite method except building up and maintaining body resistance. Personally I rarely worry over patients with putrid discharges. A finger curettement will not damage nature's wall of defense, the type for real worry is the one without putrid lochia, with frequent irregular chills, carrying a moderate temperature, and a pulse from 110 to 120, exceedingly alert and from appearance in very good condition. In general, treating sepsis expectantly will bring favorable results. Most of them get well; some die, however. I would hesitate to get so radical as to ligate the

pelvic veins of all patients on the fifth to the seventh day on account of the much greater mortality compared with the expectant treatment. Those cases which go on and die, however, we naturally wish that we had ligated their veins. Herein lies the value of Doctor Schwarz' and Doctor Dieckmann's contribution. It offers us a new point in diagnosis which will give us a clue as to which cases we should always ligate. In my opinion these cases will be very small in number.

DR. SYLVESTER J. GOODMAN, COLUMBUS, OHIO.—I do not believe the curette has had any place in the treatment of puerperal sepsis for a good many years.

I remember many, many years ago at the American Medical Association when John B. Deaver was advocating operation upon every case of appendicitis, Dr. Keene arose and said that if Dr. Deaver said he had appendicitis he would submit to an early operation, but if a body as important as the American Medical Association were to say to the profession in general that they advocated a very early operation in every case of appendicitis a calamity would happen. Now if a man of the ability and reputation of Dr. Schwarz, should send forth the dictum from this Association that in the early stages of suspected puerperal sepsis, in cases of early putrid discharge, it was advisable to curette either with the finger or a dull curette, then every pseudosurgeon and general practitioner would resort to this method of treatment, with most unfavorable results.

DR. JOHN O. POLAK, BROOKLYN, N. Y.—I wish Dr. Schwarz would clear up in our minds one point in regard to the foul discharge in these cases. Perhaps my conception is wrong but I had always supposed that the foul discharge was the result of tissue necrosis, which was the result of nature's defense below the necrotic area in blocking off the circulation. Consequently I was very much surprised, if I understood the doctor correctly, when he spoke of the curette, for I felt that he was harrowing up a field. I do not believe it would be possible, as Dr. Goodman says, for even such a suggestion to go out from this Society without some adverse discussion.

By following out Dr. Ill's principles for handling these cases I feel that I have fortified my patients against extension from the uterus. I wish Dr. Schwarz would put before us the definite clinical picture of those cases of thrombophlebitis in which, in his judgment ligation is going to offer, the best result. I am frank to say that I am not a believer in ligation from my experience, which has not been satisfactory. Our mortality is just 75 per cent in the cases treated by ligation.

The cases treated on the general principle of trying to establish an individual defense by drainage, posture, blood transfusion, etc., have given us a very much better percentage. But I am convinced that there is a time when if the veins were tied and the uterus removed, it would be possible to save some of these cases.

DR. H. M. RUBEL, LOUISVILLE, KY.—I should like to ask what positive percentage of blood cultures were found routinely. Negative reports are too prevalent in obviously infected cases. Should we have our bacteriologist wait for the chill, or catch it afterward, when we have showers of bacteria invading the blood stream?

DR. EDWARD SPEIDEL, LOUISVILLE, KY.—This paper clears up to some extent the reason we have had so many negative reports from laboratories regarding cultures from frankly infected cases. No doubt anaerobic cultures were not made.

It is surprising to me to learn that investigation of the placental site shows such a lack of thrombosis of the veins in that area early after labor, because it has been my teaching that one method of nature's protection against hemorrhage is a thrombosis at the placental site and that the blood at the time of labor clots more readily than under other circumstances.

Another surprising feature in reference to treatment is that such massive blood transfusions were used. I should imagine that in such circumstances there would be

an anaphylaxis or a severe reaction from 700 c.c. of blood introduced repeatedly, especially as the same donor could hardly be used again, and if different donors were used that would be a disturbing factor.

I am inclined to agree only partly with the more aggressive measures that were advocated in puerperal infection. I expect to reintroduce in our hospital this year the method brought out a number of years ago by Dr. Ill, which I will try to state and if I am not correct I hope he will improve upon my statement. I think it is a very wise plan forty-eight hours after a well-developed puerperal temperature to enter the uterus in the proper way for the purpose of getting lochial discharge from the upper part of the uterus for bacteriologic examination. We do it with a curved glass tube and a rubber bulb at the end. That material can then be sent to the laboratory for an examination and culture. At that time an intrauterine douche of 25 per cent alcohol may be given, the uterus loosely packed with gauze soaked with 25 per cent alcohol, with a catheter in the center of it carried to the fundus. Two ounces of 25 per cent alcohol are introduced through this catheter every two hours for forty-eight hours. After the forty-eight hours the gauze and the catheter are removed. In this manner any detritus that has been left in the uterus, and a great deal of infective material, will be carried out; there will not be the danger of having disturbed the protective mechanism of the uterus by any severe measures, such as curettage, which I know Dr. Schwarz did not mean. By curettage he meant, I am sure, simple removal of material by the finger. But I think even so a disturbance may be created and the defensive mechanism broken down, whereas by this method I think no harm can be done and I should judge a great deal of deleterious material might be removed.

DR. H. W. YATES, DETROIT, MICH.—As far as the discharges being fetid is concerned, we have not so much anxiety about those as about the cases that run moderately high temperatures with chills and no fetid discharge; those cases in which, as Dr. Schwarz has brought out, there cannot be secured in some instances a positive blood culture. And, by the way, we find that the blood cultures are more likely to be secured in those instances where the temperature runs low in the morning and then in the afternoon rises to 103° or 104°; and if chills are a feature, the culture should be taken during them.

I should very much hesitate to do packing in a uterus which was definitely septic. It would seem to me that the least possible damage that could be done should obtain. I was greatly surprised, as was Dr. Polak, when the use of the curette was suggested. Certainly in many of these instances there is some small portion of decidua or placenta remaining, and if the cervix is easily dilatable by the finger, it is safe to use the finger in this way because it is a very difficult thing to determine in the early cases of pregnancy whether all of the material has been expelled. In this way I think it is perhaps applicable. On the other hand, it has been our experience in an enormous number of abortion cases to find that if they are let alone, if not instrumented, and no palpation done at all, there is this protective zone built up which has been referred to by several speakers. The temperature and the reactions keep up for a considerable length of time and finally begin to recede and after five or six days the temperature declines. Four or five days succeeding its return to normal it is safe to remove whatever is there, or peradventure the uterus has not already thrown it off which in many instances it does.

DR. JAMES E. DAVIS, DETROIT, MICH.—In attempting a solution of some of the problems we may divide the consideration of the subject into two parts. One is distinctly economic and belongs more entirely to the hospital. It is utterly impossible in the average hospital to have such work done as we have had presented to us here today; to have a special worker like Dr. Dieckmann assigned to a problem like this is a very great help. The average laboratory is so organized and the allotment

of money is so restricted that only a sufficient number of workers are available to do the routine daily work.

The clinician represents the other side of the problem. The clinician in his hysteria, when he is bearing the burden of some of these puerperal cases, comes to the laboratory with all his war paint on and accuses every one in the laboratory of inefficiency. He has not ordered the blood culture perhaps until after the period has passed when it is possible to obtain a positive culture. You will notice in the charts that Dr. Schwarz presented that he obtained his cultures at the time of the chill. That is the ideal time to obtain the cultures and it is utterly useless in the majority of cases to take cultures at promiscuous periods.

There are some real problems in the growing of organisms. The efficiency of the bacteriologist must be unquestioned in research work of this type. It is no easy task to recognize the morphologic changes in bacteria. The mutation changes that come in relation to the symbiotic forms that are found requires the ability of an expert bacteriologist for their recognition but I suppose every clinician expects his laboratorian to return to him an expert opinion. He has no right to expect that of the average laboratorian.

The culture media, for instance, is important for the laboratorian to know in order to have these organisms grow in a proper way for their recognition. There is often a very narrow margin between pathologic and nonpathologic forms that the average inexperienced worker is totally unable to recognize.

In regard to tissue changes one can generalize to a very particular degree. All of the reaction is essentially an inflammatory one, that has begun in the circulatory system and its manifestations are more or less closely related to that system.

In regard to the lymphocytes, they have been spoken of as having some specific relation. If there is an infection that begins and remains or manifests itself chiefly in that system, there will be an exhibition of a large number of lymphocytes either in local or general positions. It is a fact that many of the infections of that system are not very well understood as to the significance of their etiology.

There is just one other objection to Dr. Schwarz' part of the symposium: He said the organism was harbored by the patient. That is exceedingly comforting, I am sure. Every clinician will be delighted to hear that and to accept it when he is in a dilemma. Now that may be so some of the times, but the facts are, that in the majority of the severe cases where the patients die the organism has not been harbored by the patient.

DR. SCHWARZ (closing).—I do not want to be misunderstood. In emptying the uterus where infected clots or retained placental tissue is suspected, we use the finger or a blunt curette. The blunt curette in most instances is a vaginal depressor. We do not wish to disturb the spongy decidua. The retained pieces of placenta are usually loosely attached and can be removed with very little disturbance. It is when this retained tissue becomes necrotic there is offered a favorable media for these anaerobic organisms, and as the anaerobic streptococcus is frequently found in the vagina such a condition would favor its propagation.

As we have very few cases of puerperal infection due to pyogenic organisms, we feel that these cases of pure anaerobic streptococci are frequently autoinfections. A temperature over 101° and a lochia with a foul smelling odor on the fourth or fifth day, indicates a uterine culture and a cleansing of the uterus as we have mentioned. The normal lochia at this time has a peculiar fleshy odor but is in no sense foul. Ordinarily there is not sufficient decayed material in the uterus to cause an odor unless the uterus is invaded by these organisms.

As regards ligation, our experience with these organisms is still very limited. Our results have been discouraging with blood transfusion in these infections, and therefore we feel that in the future we shall consider ligation seriously.

In contradiction to what Dr. Davis has said, any laboratory technician can easily isolate these organisms and it is just a question of growing them anaerobically which is very simple, the technic of which has been outlined in this paper.

DR. PALMER FINDLEY, OMAHA, NEB. (closing).—I cannot refrain from expressing my surprise and, to some degree, my concern that the question of the curette should come up in such a society as this. I thought the thing had been buried long ago and I wish that our remarks might be straightened out in the record on the use of the curette because I fear when the general practitioner comes to read our transactions he might interpret our remarks as an endorsement of the use of the curette in the acutely infected uterus. I cannot understand how any one who has any knowledge whatsoever of what is going on in the defense mechanisms of the uterus in taking care of the attacking organism would use it. It is fraught with danger, and my judgment would go back to what I thought was the settled conclusion that the proper management of it is one of masterly inactivity.

That there is a cellular defense mechanism in the pelvic structures there can be no reasonable doubt. To what extent our knowledge of this biologic defense can be applied in the treatment of puerperal infection I am not prepared to say, but it would be well worth while to endeavor to stimulate these phagocytic cells in the effort to combat infection.

NEW YORK OBSTETRICAL SOCIETY

MEETING OF DECEMBER 14, 1926

THE PRESIDENT, DR. GEORGE H. RYDER, IN THE CHAIR

DR. JAMES A. HARRAR reported a case of **Twin Abdominal Pregnancy with Unusual Features.** (See page 752.)

DISCUSSION

DR. HARBECK HALSTED found in a study of the cases in recent years at Sloane, five instances of abdominal pregnancy over six months. One woman died and three live babies were delivered.

Dr. Halsted would not deliver the placenta unless it and all its attachments could be removed at the time of operation. One of the babies had been dead nearly a week and even then when the late Dr. Studdiford tried to take out the placenta there was profuse hemorrhage. That was the only casualty. In the other case the baby was dead six weeks before operation. That placenta was fairly easy to separate.

DR. A. C. BECK had difficulty with one of these cases in which the patient almost bled to death, as a result he concluded that possibly the risk would be less if the placenta were left alone. On looking up the literature he found that this was the Italian method of treatment which was followed about 1895, and a dozen cases treated in this manner showed results equally as good as those that followed marsupialization. As a result, he advocated that plan of treatment in the cases which were attached to the broad ligament, the back of the uterus, the intestines and so on; in other words, that were not pedunculated and where the blood supply to the placenta could not be easily controlled. Since that time Dr. Jewett has had a case, which Dr. Beck thinks he reported before this Society, and in which he left the placenta in the abdomen without drainage.

He did not think there was any question that in a case where the fetus has been dead a month or so the placenta should be removed.

Dr. Beek collected about 2,000 cases of abdominal pregnancy with living and dead fetuses after the sixth month and very few of the men had difficulty with the removal of the placenta in cases where the fetus had been dead four to six weeks before the operation. Certainly, if the fetus is dead, he believed it a good plan to wait another month before attempting operation because then the placenta can be removed readily and there is little danger of hemorrhage.

DR. JEWETT said, as the result of his experience, that if the placental attachment in a case of abdominal pregnancy was such that one could control the bleeding, the placenta should be removed. If, on the other hand, there was a broad attachment that could not be removed without dangerous hemorrhage, it would be more advisable to leave the placenta intact. In his particular case an attachment of the placenta was present over the lower and posterior portion of the broad ligament which extended upward over the iliac vessels. Inspection showed that this was a dangerous position and the cord was ligated and the abdomen closed. About a year or so subsequently this patient had an acute appendicitis and Dr. Jewett opened the abdomen. After removing the appendix, he inspected the right lower quadrant of the pelvis, or the right side of the pelvis, where the placenta was located, and found a condition of the tube that simulated a chronic adnexal inflammation. He removed the right adnexa and a microscopic section showed an absence of placental tissue in this mass, conclusively proving that the cavity could take care of the placenta that was left.

DR. H. R. CHARLTON read a paper entitled **Prevention of Carcinoma of the Cervix.** (See page 755.)

DISCUSSION

DR. COOK believed that students of cancer pretty generally are agreed now that the type of lesion which predisposes to the development of cancer at a given site is a type of lesion which does not of itself tend to heal. Whenever we have such lesions, regardless of the exciting cause, cancer is a distinct possibility. There are, of course, undoubtedly other facts, because under the same circumstances not every one develops cancer. However, given a type of lesion which does not of itself tend to heal, particularly in an organ which is notoriously common as a site of malignant disease, obviously we are dealing with a very treacherous combination, and that we have in the cervix, the seat of chronic cervicitis. He did not know from simple inspection of the cervix, whether a particular cervix is apt to give rise to cancer or not. Exactly what histologic changes lead to the development of cancer and how long a period must elapse from the time that you see certain changes to the time that you may expect the appearance of cancer, are all unknown. Certainly, it is obviously true from a histologic study of cervixes that are amputated that cancer may develop in a cervix which, grossly at least, looks very much more innocent than another; in other words, the rough, red, eroded cervix, which looks almost cancerous in itself, sometimes is not, as far as one can judge, any more dangerous than the less alarming appearing cervix.

The histologic changes which have been stressed as of special significance are, of course, those in which the epithelium, normally of a secretory type, which lines the endocervical canal and the glands of the cervix, tend to undergo stratification, cornification, and metaplasia. This makes it resemble more nearly the vaginal epithelium, and such cervixes, naturally, are looked upon by the histologist with

more suspicion than cervixes in which there is simply erosion and lymphoid infiltration. Changes in the vaginal cervical mucosa itself do not appear to be of especial significance.

Dr. Cook believed that a painstaking collection of selected, excised, or amputated, cervixes, properly preserved for histologic study, closely checked with a corresponding series in which such prophylactic operations were not done, might give us some help, because what is needed is not only the thorough 100 per cent treatment of chronic cervicitis but some better histologic control, some data which will enable the examining pathologist to advise the clinician that this cervix is really pre-cancerous.

DR. W. P. HEALY said the American Society for the Control of Cancer has been devoting a large amount of effort and money in an effort to educate the public in the question of the early diagnosis and recognition of cancer, apparently because that is about, for the time being, the only practical thing that a society of that kind can accomplish to advantage with the resources at hand. As a matter of fact, that does not control cancer at all. All it attempts to do is to give the individual who may possibly develop cancer a better opportunity to have his or her cancer recognized in time to have his or her life prolonged or possibly saved; but it has nothing whatsoever to do with the control of cancer as a public health problem. He felt, therefore, that that organization is failing in its actual purpose—the control of cancer, because that must come from another source. It must come from a source that the doctor has referred to in his paper, namely, an effort to find out what causes cancer and prevent it in that way.

Dr. Charlton has specifically emphasized cervicitis; in fact, that has been the entire topic in his paper. Cervicitis of the type he refers to, namely, infectious cervicitis, Dr. Healy believed had very little to be credited with from the standpoint of causing cervical cancer. Infectious cervicitis is most common in prostitutes, and prostitutes seldom have cancer of the cervix. As a matter of fact, Dr. Healy's own reaction to the etiology of cancer of the cervix is that it is based very much more upon trauma resulting from injury—tears, destruction of the lymphatic protecting power of the cervix by lacerations from childbirth, or by large destruction of cervical epithelium as we see in erosion of the cervix. For that reason, he believed one of the best ways to prevent the development of cancer of the cervix in the younger woman who develops an erosion is to thoroughly cauterize it under anesthesia. The older woman does not develop erosions, it is a very unusual thing to see an erosion of the cervix in a woman over forty years of age. In those young women one can by use of the Paquelin cautery, not only destroy the erosion, but conserve the cervix for its normal function, improve the blood supply to the tissues to such an extent that they protect themselves from the possibility of the development of cancer. In the older woman, over forty years of age, in whom we know that the child-bearing period is at an end, if there is a diseased cervix, it should be amputated in practically every instance. In reviewing the cases at the Memorial Hospital, the most important factor is not cervicitis from some ordinary infection, but the pregnancy which has damaged the cervix and reduced its resistance and permits something to get into those tissues that later on may result in the development of cancer.

You occasionally see carcinoma develop in the cervix of a very normal young woman who has had no cervicitis, and no pregnancy, so that there are other factors that we have no control over that do bring about the development of carcinoma. Dr. Healy concluded that, taking the factors that present themselves to us as the most common, extensive trauma is the most important one, and not infection.

DR. J. MILTON MABBOTT referring to a paper read before this Society a few months ago on the actual cautery treatment of cervicitis, stated his belief that the resulting cicatrization of the cervix might result in an increasing number of cancer cases, when the susceptible age is reached by these women. He, therefore, favored the Sturmdorf, or similar operation, which results in a more natural lining of the canal.

DR. HARRY DORMAN, BEIRUT, SYRIA, said that in Beirut, there was relatively very little carcinoma of the cervix, and that he saw only five or six cases in the course of a year. On the contrary, they encountered a great deal of cervicitis and erosions. Cervices in all stages of laceration are common, so that he was not impressed with the incidence of lacerations of the cervix or cervicitis as being one of the important factors in the production of carcinoma. It seemed to him that there must be some other cause for it which is prevalent in this country and which in Syria does not prevail to the same extent; and the only practical suggestion he could make as regards the question of prophylaxis of carcinoma is for women to move to Syria.

DR. H. B. MATTHEWS said that as this is the day of prevention, the first way to prevent these diseased conditions in the cervix is to do immediate cervical repair, as advocated and carried out by Dr. Emge, of San Francisco, who had written two papers on this subject in the last four or five years; and by Dr. Bubis, of Cleveland, who reported over 200 cases and followed them for a sufficient length of time (three years) to enable him to distinctly state that primary repair of the cervix is a perfectly good surgical procedure.

Secondly, if you do not believe in the immediate repair of the cervix, then with a nasal type cautery eight to ten weeks postpartum, you can inroll and invert these everted, lacerated cervices so that healing takes place without ectropion, an excessive amount of scar tissue, stricture and stenosis. If you do not see the case until the woman has a deeply infected cystic cervix, then you can do a deep cauterization under anesthesia, if you are careful not to use the round-pencil type of cautery and destroy all the endocervical mucous membrane. One-half of the circle is done at one sitting, and two or three weeks later the other half, leaving islands of mucous membrane covered with epithelium so that the canal can become epithelialized again and stricture or stenosis avoided. The low-grade chronic infection and the lacerations which it seems are thus healed, have something to do with the production of cancer. Further if you do not choose to use the cautery, then an almost perfect surgical procedure is the Sturmdorf operation, done according to the proper technic.

DR. CHARLTON (closing) said that in relation to the duration of irritation prior to evidence of malignancy, he would like to refer to a statement made by Leach, who said that in many of the chimney sweeps in Great Britain the irritation due to the soot and sebaceous mixture goes on for a period of 10, 15 or 20 years before carcinoma develops. Dr. Charlton felt that Dr. Healy limited his nomenclature too sharply. When he (Charlton) spoke of cervicitis he did not in any way limit cervicitis to cases which are primarily due to the gonococcus or such other organisms as various prostitutes may harbor. He had in view the chronic inflammatory conditions in the cervix following lacerations, following injury of one sort or another, as well.

Dr. Healy spoke of malignancy developing in young women who had had no cervical trauma. The columnar collar that extends out of the canal and invades the portio is a hyperplasia which may precede the development of cancer even in these young women, and he was rather inclined to believe that it does. He was absolutely in accord with Dr. Healy's attitude towards cauterization of the cervix.

DR. R. A. HURD read a paper entitled **A Study of 1000 Cases of Uterine Retroversion.** (For original article see page 742.)

DISCUSSION

DR. HERMAN GRAD said that Dr. Hurd's study afforded him an opportunity of ascertaining the results from his own operations at the Woman's Hospital. In the cases in which his procedure failed he believed this was due to the lack of proper adhesions between the round ligaments and the internal inguinal ring. The uterus has a certain normal level in the pelvis and if this is disturbed no type of operation will be successful, especially if the pelvic floor, the cardinal ligaments or the fascia are defective. In some cases that came to secondary operation Dr. Grad found that the uterus had undergone sufficient hypertrophy so that its weight alone would undo the previous operation.

As for the point made that where the anatomic results of the operative procedure are good and the patient is relieved of her symptoms, this in his belief was due to the fact that before operation the pelvic circulation was disturbed but that with the restoration of the pelvic floor the blood flow was equalized and the symptoms consequently relieved. Dr. Grad called attention to the main features of his procedure in which the broad ligament is split, the two layers separated, the round ligament shortened and sutured to the fibers of the internal inguinal ring. He claimed as a result that nothing abnormal is created in the pelvis, the abdominal wall is not traumatized and the fallopian tubes are not injured.

DR. DOUGAL BISSELL said that he wanted to sound a note of warning regarding the present day tendency of operating for retroversion without due consideration of the possibility of securing relief through other means, for retroversion is a mechanical pathology which can usually be attacked and relieved by nonsurgical means. Yet operations for its correction constitute a goodly proportion of the surgical work done on the gynecologic services of the hospitals throughout the country. The fact that a large number of these cases could be afforded relief without operation does not reflect credit on the mechanical skill of the operators; throws doubt upon their knowledge of the specialty they follow and may even bring into question their moral character from a commercial viewpoint. In fact gynecologists have reached a position with respect to the frequency of retroversion operation almost, if not as faulty, as that reached some time ago by the general surgeon on the frequency of appendectomy, but the general surgeon holds one advantage over the gynecologist in his position, i.e., if the operation be done unnecessarily, the patient, if he survives, is usually no worse off and is always benefited to the extent of being insured against the possibility of appendicitis. But though the patient operated on for the correction of retroversion may secure permanent relief, too often she gets but temporary relief and unless the appendix be removed at the time of operation, she cannot be said to have been at all benefited.

Dr. Bissell deplored the fact that pessaries do not constitute a more important part of the armamentarium of the present day office technic. Some say that they never use them; on the other hand what is equally, if not more distressing, is a case where an ill-fitted pessary inflicts injury by pressure or is too small and serves no purpose. I have several curious morbidity dealing pessaries in my possession inserted by men of big reputation that work their way almost into the pelvic viscera. Patients with retroversions in the hands of these men might well submit to operation.

If the pessary cannot be employed with skill, it is a dangerous instrument,—but why is it Dr. Bissell asked that the art of fitting a pessary is fast becoming

a thing of the past? The responsibility for this failure must rest at the door of the teaching institutions. Colleges teach its use theoretically, hospitals pass it by and postgraduate institutions treat it much the same, but it must be said in all fairness that the hospital regime of the present day is more adapted to operative work than to treatment; that the patients who enter its wards have been recommended by clinical assistants or family physicians and have been told on being sent in that an operation was necessary; they have adjusted themselves to this idea and enter with the expectation of being operated and are bewildered and disappointed if not operated. Had they been properly handled outside, a good percentage of these patients would gladly have accepted the relief a properly fitted pessary would have afforded.

Dr. Bissell did not advise the pessary in all cases of retroversion. If the patient deliberately prefers an operation to a pessary after all facts have been clearly placed before her she is entitled to her preference.

If the pessary cannot be fitted to advantage or cannot be introduced and removed without great distress and there exist definite symptoms of retroversion, operation is justified. If the retroversion is limited in motion and the corpus does not assume its normal position on manipulation, the pessary is contraindicated and an operation should be done. If the corpus is fixed as the result of an old inflammatory process and the patient has definite pelvic symptoms, an operation is justified to relieve this and the opportunity should then be taken to correct the retroversion.

There are other indications which justify operation but these are difficult to classify. There are cases, for instance, where the sigmoid is adherent to the ovary, tube, broad ligament or round ligament, the result of a sigmoiditis in childhood, sufficient to restrict the uterus in its motion but difficult to determine until the abdomen is opened, also congenital deformities, particularly those of the round ligament where this ligament passes downward and backward from the internal ring to the extent of 4 or 5 cm. in the direction of the cecum, and anchored by the intraabdominal fascia so as to change its course abruptly in a median direction. The direction of the pole under these circumstances when effort is made to restore the fundus to its normal position is, of course, backwards and to the right.

Subjective symptoms associated with retroversion of the uterus may in great part be dependent upon some other pathology so that the etiology of all symptoms found should be traced to their source or sources. The patient should be informed then and there of the findings and operated upon only with a clear understanding of a contemplated second operation, if both cannot be done at the same time.

A retroversion technic which does not insure against recurrence after labor, is in Dr. Bissell's opinion, unsatisfactory, and one which does not permit of pregnancy taking place soon after operation does not meet all the requirements of a satisfactory technic. So confident is Dr. Bissell in the results of the operation which was described that he does not hesitate to perform it even when unexpectedly opening the abdomen, he found a five or six weeks' pregnancy complicating the malposition. Three times he had met this complication of retrodisplacement of the uterus and on each occasion, he unhesitatingly shortened the ligaments with satisfactory results; two of these cases went to full term and delivered without recurrence; one had an abortion performed near the fourth month, having been thoroughly disgusted with the results of the operation. The latter patient, of course, felt confident that the operation would relieve her of her embarrassment and failed to give the proper history of her case; examination following abortion showed the uterus to be in proper position.

DR. HARBECK HALLSTED wanted to protest against the way in which the Alexander operation had been spoken of. He believed that, in the presence of a movable retroversion without complications, in a multiparous woman, it is the ideal operation, as opening of the abdomen is not entirely without risk, and if we have an operation that will cure, as was shown by this series of cases, 100 per cent of cases without opening the abdomen, he did not think we should relegate that operation to oblivion. We should bear in mind the fact that it should not be done in nulliparous women, but only in cases where we can replace the uterus, where we feel an operation is indicated.

DR. H. D. FURNISS said that there was a type of case that should be left alone, namely, the so-called congenital retroversion. The results of operation usually are not good either from a symptomatic or anatomic standpoint, as it is apt to recur. If done a combination of shortening of the round ligament plus uterosacral shortening is in order.

A complication Dr. Furniss found in the so-called uncomplicated cases is pelvic varicocele, even where there is no adnexal disease, particularly in the thin woman of the so-called asthenic type. It is relieved to a great extent by putting the uterus in proper position.

DR. F. C. HOLDEN said that about ten years ago he read a paper before the A. M. A. on potent factors in the failure of operations for retroversion. He tried at that time to analyze the different types of retroversion and specify why in certain cases operation was followed by failure. Since then he had learned a great deal about retroversion. He assumed that the subject was a discussion of different types of operation. One thousand cases were presented with very excellent statistics. The Webster-Baldy operation is the one which has fallen down the most. This operation was condemned some time ago by Dr. J. O. Polak in which the results following that operation were based on a series of cases to which he referred, but at that time he was not doing this operation according to the Webster-Baldy technic. That applies to many of these operations. A man is doing a certain operation, but it frequently is found that he is not doing it according to the proper technic laid down for the particular procedure.

Dr. Holden believed there were many operations satisfactory only if they were well executed, and that there should be some individuality about the selection of operations, or a combination of operations. In his hands the Webster-Baldy procedure gave good results, especially with a prolapsed uterus. He did it after a certain technic and had no record of any private cases where it has failed. Many of the operations that are failures postpartum are not failures because of the operation, but because the patient does not receive proper prenatal care and proper care after subsequent pregnancy. In the hands of the ordinary operator you probably get as large a percentage of results with a simple operation like the Olshausen as with Bissell's operation, which is an ideal operation, but difficult.

Dr. Holden believed that Dr. Hurd should classify retroversions as acquired and congenital and thinks it makes quite a difference how we treat them.

DR. GEORGE W. KOSMAK wanted to confirm what Dr. Bissell said about the conservative treatment of retroversion of the uterus, particularly in the young woman. If we follow our cases three or four months after delivery, a great many retroverted uteri are found which are not detected when the patient is discharged from the hospital. Very often the uterus is anteverted in position for four to six weeks and assumes the retroverted position after the woman is up and about considerably, and at three months retroversions are detected that are not present at the time of discharge. For that reason Dr. Kosmak believes all women

who have borne children should be examined at least three months after labor. We find a great many young women have movable retroversions which are noted after the first delivery which may perhaps give them symptoms which can be relieved readily enough by the means Dr. Bissell referred to, namely, the proper use of a properly fitted pessary, calisthenic exercises and a number of other things that will undoubtedly suggest themselves. In most of these young women it is better to postpone operation until they have gone through as many pregnancies as they desire. In women who have done this and in whom the retroversions persist and are not relieved by pessaries and other measures employed for this purpose, operative procedures can be indulged in.

Dr. Kosmak wanted to second what Dr. Holden said about the efficacy of the Baldy-Webster operation in these cases. The uteri are usually heavy and the ovaries usually prolapsed.

Should these women become pregnant again the results are almost always good, and in his own experience he had not had a single failure of a Baldy-Webster operation, except in one instance just about a year ago. In this woman, who had previously had two children with very difficult labors and extensive lacerations and a large congested uterus which was causing a great deal of pain and trouble, he did a Baldy-Webster operation after the second pregnancy. After her third pregnancy a recurrence took place which was due to the very difficult labor and bearing-down efforts rather than to the failure of the operation itself. Therefore he wanted to say a good word for the Baldy-Webster operation, although the statistics at the Woman's Hospital do not seem to bear a favorable attitude toward this procedure.

DR. HURD said, in closing, that in justice to Dr. Grad, all these cases were in the public wards and were done by a group of men. The cases he had personally reported, were attended by a slightly better percentage; that is, there were fewer recurrences in those cases than in the ones done by the group. Dr. Hurd believed that this might also hold good for the Baldy-Webster operation, as Dr. Holden suggested, for, perhaps they were not as familiar with the technic of the Baldy-Webster operation at the Woman's Hospital.

BROOKLYN GYNECOLOGICAL SOCIETY

STATED MEETING, DECEMBER 3, 1926.

DR. DONALD MACOMBER, Boston, Mass., (by invitation) read a paper on **The Emotional Life of the Woman in Relation to the Practice of Gynecology.** (See page 732.)

DISCUSSION

DR. W. H. CARY, referring to the importance of the subject, stated that the Fellows who were associated with him at the hospital had often heard him refer to this interesting group of patients whose symptomatology was due to certain emotional experiences which simulate the symptoms of a pathologic disorder. He believes these conditions are becoming and are going to become still more common in this day of freer relationship between the sexes and the artificial stimulation from alcohol. It really makes very little difference whether one is dealing with a woman of the intense home-loving, repressed type, such as Louis Bromfield discusses in his "Early Autumn" and "Green Bay Tree," or whether one is dealing with the type of women, such as Chambers describes in his books of New York

society, or the type that Galsworthy gives us, the flighty, high tensioned girl. The sum and substance of this problem is this: the abnormal aspect of repression and sexual overstimulation is passive pelvic congestion. There are certain symptoms which can be considered almost pathognomonic, such as the oversecreting cervix to which Dr. Macomber referred, the enlarged tender ovary, which is not inflamed in the sense that it is involved in the adhesions of an associated salpingitis, and bladder irritability. When you find these symptoms in a patient without any pathology to explain it, have the courage of your convictions and say, "Here is a case of emotional origin." Aside from depletion with tampons the question of exercise is important, and in this connection Dr. Cary considered horseback riding of great value. He feels that in the intense, quiet, subdued sort of patient it is well to encourage her to get out socially and to meet people in order to obtain the advantage of social contacts and emotional outlets. When one considers that, of the college women who answered the questionnaire sent out by the Society of Social Hygiene in New York, 12 per cent admitted sexual intercourse and 60 per cent some form of abnormal sexual stimulation, it is evident that a big percentage of patients are bound to show symptomatology which has some origin in the emotional side.

DR. GORDON GIBSON claimed that before we can appreciate emotional disturbances we first must understand what the emotions are and determine their origin, and then apply these developed feelings to things which happen in the life of a woman. Very few psychologists have the same conception of the origin of emotions. However, they all have a fundamental beginning, and that is the first concept. What is the first concept that a baby has? It is a concept of self. The first thing a baby takes an interest in is its fingers and then its toes, and it is very happy in playing with its fingers and its toes, as long as it is not disturbed. If something disturbs it and distracts it from that happiness, the disturbance leaves an impression on the baby. The happy baby is one that does not have its self-concept disturbed, and as that baby grows and the individual develops, its concept of self is influenced by its environment, by its training, and by the attitude of those with whom it comes in contact. Ultimately that individual develops an ideal and a hope, and with that ideal and that hope are certain so-called higher feelings. A higher feeling is a painful one if it conflicts with that hope and ideal, and it is a joyous one if it concurs with the individual's hopes and ideals. Every girl as she is trained and grows up has a certain sex ideal. If her experiences agree with her hopes and her ideals, her emotion is one of joy; if they do not, it is one of grief or pain. The emotion gradually becomes greater and greater until it dominates her consciousness. This becomes so strong that it becomes a conscious emotion which dominates her reactions. The emotional disturbances are present because of the failure of the woman to arrive at her hopes and her ideals. As an effect of that there is developed a low emotional threshold, as the neurologists like to speak of it, and that causes all sorts of emotional disturbances proclaimed as symptoms.

DR. HARVEY B. MATTHEWS considered that this problem is a dual one; and that both the man and the woman must be studied. The gynecologist must quite often call in the urologist or psychiatrist for diagnostic aid. The three must work together.

Another very important point is the matter of chronic passive congestion. He agreed that this leads to certain pelvic lesions, notably leucorrhea and multicystic ovaries. Chronic passive congestion must be at least alleviated, if not eliminated in the cure of sterility, or in the improvement of fertility. A cervix need not necessarily be the seat of a chronic infection because it has a discharge coming from it.

A third point which might be referred to is the aggravation of chronic endocervicitis by long continued passive congestion in the pelvis, with an increase in the leucorrhea.

DR. CAMERON DUNCAN wanted to know what effect Dr. Macomber had obtained with psychoanalysis in these cases in the female. The genitourinary men can often clear up some of these infections in men by treatment along urologic lines, and the psychologist by getting some complex straightened out.

Another thing that seemed to Dr. Duncan worthy of a little attention was the question whether abnormal emotions in the female were not due to a lack of normal emotions as a result of overcrowding or overstraining during the adolescent period.

DR. A. KOPLOWITZ said that for quite a number of years he had been accustomed to instruct the husband in his duties to his wife. The various ways of satisfying her sexually and allowing her to have an orgasm will almost revolutionize her entire sexual life and eliminate pelvic congestion.

DR. MACOMBER (closing) said that for depletion he used boroglycerin suppositories, or some with ichthyol or protargol. The other standard methods of depletion are cold sitz baths, and hot douches. One should find the cause of the congestion and treat it emotionally as well as physically. Dr. Gibson spoke about the states which precede emotional disturbances, and he fully agreed with him, but wanted to limit his presentation to the patient as she comes into your office, with certain gynecologic symptoms. Of course, one does not know when one listens to their story whether he is dealing with a case of gonorrhea, if the patient has a leucorrhea for instance, or with an emotional disturbance. When one finds that there is an emotional disturbance in the case, then the investigation must go back far enough to find what cause of the dissatisfaction lies at the background of the emotional disturbance. As for psychoanalysis, although Dr. Macomber had sent some patients to the psychologist, he believed that usually one can best do his own psychoanalyzing. It is a matter of searching into the background, into the subconscious life of the patient, to forgotten experiences. This was illustrated by the patient to whom he referred, who had been raped twice in girlhood. That terrible emotional experience persisted into married life and led to ten years of sterility before it was finally corrected.

A number of patients who complained of pruritus, had an oversecretion. He had had patients who took daily douches to avoid that but the pruritus persisted until the emotional background was cleared up.

As for the "dual" problem, he felt that one is very much more likely to succeed by a one man approach. Impotence may be due to the man, or to the woman. It is usually a mutual problem and if one turns that over to the urologist, or to the psychologist, or to some one else, he will never get anywhere. To cure those patients one must work the thing out for himself, because it is the prestige, so to speak, that one gets from thoroughly understanding all the ins and outs of that particular problem, that enables him to accomplish a cure. In several of the cases quoted vaginismus and impotence had been present for as much as ten years.

Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

Collective Review

THE OBSTETRIC LITERATURE OF 1926

BY J. P. GREENHILL, B.S., M.D., F.A.C.S., CHICAGO, ILLINOIS
(Attending Obstetrician, Chicago Lying-In Hospital and Dispensary; Attending Gynecologist, Cook County Hospital; Associate in Obstetrics, Northwestern University Medical School)

(Concluded from May issue.)

PUERPERIUM

Liubimowa¹⁴⁵ who studied the effect of coitus on labor and the puerperium, found that premature rupture of the membranes and morbidity during the puerperium occurred twice as often among the patients who had intercourse during the last months of pregnancy as among those who did not. The reviewer has knowledge of a few cases of severe puerperal sepsis, two of which were fatal, where the infection most likely was due to coitus just before the onset of labor. In these cases, the membranes ruptured during coitus and the patients had spontaneous deliveries.

Küstner¹⁴⁶ treated ten patients who had puerperal fever by giving huge doses of alcohol and obtained good results. E. Novak¹⁴⁷ questioned 25 surgeons, gynecologists and obstetricians concerning the value of anti-streptococcus serum and found that 16 considered it of no value. Not one evinced any enthusiasm for the serum.

The hemorrhages which occur late in the puerperium are not always associated with retention of placental tissue. Secondary hemorrhages may occur with the onset of symptoms of a severe infection, and a septicemia may follow if intrauterine manipulation is practiced in the attempt to empty the uterus of suspected placental remains. Couvelaire¹⁴⁸ reports three such cases and suggests for this condition the name metrorrhagic form of puerperal infection. Levy-Solal and Ravina¹⁴⁹ report five additional cases. For severe cases, hysterectomy is advised.

THE NEWBORN

Physiology.—From researches on the amnion and vernix caseosa Keiffer¹⁵⁰ concludes that the vernix is the result of the secretion of cholesterides and glycerides by the amniotic epithelium. Vernix is not a waste product but an embryotrophic substance and should be allowed to remain on the skin to be absorbed.

Complications.—Reed¹⁵¹ makes another plea for measuring babies during pregnancy in order to avoid postmaturity. By using the McDonald, the Perret and the Ahlfeld methods, he has been able to measure babies with great accuracy. If the maturity of the child is beyond question, the pregnancy should be terminated. Nicholson,¹⁵² however, believes that true prolongation of pregnancy is rare and that there is no fixed gestation period. He agrees with Barbour that the head is the best pelvimeter and we should attempt to judge the degree of adaptation between the fetal head and the maternal pelvis.

Among 6,035 labors, Zangemeister¹⁵³ found anomalies in the first stage of labor in 2 per cent and the result was that 23 per cent of the children died and 30 per cent were born asphyxiated. The most unfavorable cases were those in which the heart tones slowed down to or below 100. In 94 per cent of all the cases, there was premature rupture of the membranes and among these, 65 per cent of the babies were born dead or asphyxiated. To determine the cause of intrauterine fetal asphyxia Louros and Müller¹⁵⁴ advise the use of chloroform. If the latter relieves the abnormality in the fetal heart tones, the cause of the asphyxia is excessive uterine contractions and no further treatment is necessary. If chloroform fails, there is a disturbance in the fetal circulation and labor should be terminated without delay. In asphyxia of the newborn, where the heart is beating and there are no or only faint respiratory efforts, the reviewer strongly recommends intramuscular injections of alpha-lobelin for it has proved very helpful.

Belding¹⁵⁵ discusses the etiology and epidemiology of impetigo contagiosa neonatorum and like other investigators, found the cause to be a strain of *Staphylococcus aureus*. Krigbaum,¹⁵⁶ however, believes that a possible cause for pemphigus neonatorum is commercial liquor cresolis compositus (lysol). At the Chicago Lying-in Hospital where more than 3,000 babies are delivered each year, commercial lysol is used and there has not been an epidemic of pemphigus for ten years. Even sporadic cases are unusual. The cause of pemphigus is a strain of *Staphylococcus aureus* which is transmitted by individuals and supplies; hence asepsis and cleanliness are of the utmost importance. Strict isolation of infected babies is imperative.

Among 5,457 confinements at the New York Lying-in Hospital, Rosensohn¹⁵⁷ found 227 stillbirths (4.1 per cent); but the striking fact is that 41 per cent of the stillbirths were macerated. Syphilis accounted for only 15 of the 94 macerated fetuses and toxemia was associated with 13; but in 44 cases no cause could be found. Rosensohn's paper supports the contention that syphilis is not as great a cause of fetal death as was formerly believed and that toxemia is of almost equal importance. This is certainly true for the white population of this country, although among the negroes, syphilis plays a very important rôle. It must also be remembered that even in patients with syphilis or with positive Wassermann reactions, not all the fetal deaths are due to syphilis.

Case and Cooper¹⁵⁸ report five cases of anencephalus diagnosed before birth and verified by roentgen-ray examination. Anencephaly represents only a small portion of fetal monstrosities and the latter are not infrequently associated with placenta previa as pointed out by Greenhill.¹⁵⁹ According to Stein and Arens¹⁶⁰ the roentgenographic diagnosis of intrauterine fetal death cannot usually be made independent of other clinical data because overlapping of cranial bones and asymmetry of the

head have been observed in the live fetus to the same degree as in the dead. Ries¹⁶¹ discusses the danger of malformation of the fetus in roentgen-ray treatment during pregnancy and reports an interesting case where many abnormalities were found at autopsy. Werner¹⁶² in an elaborate paper on "Roentgen children" points out that after radiation there is not only an increase in abortions but also a tendency to abnormal children. In experimental work on radiated animals, anomalies appear in the second generation; hence in human beings we may have to wait many more years before we really know how much damage x-ray treatment can produce.

Bland,¹⁶³ and also Newman and Levy¹⁶⁴ write on the injuries of the infant during delivery. The latter authors express an unwarranted reserve concerning the use of forceps. They feel that there are very few times when forceps should be applied and maintain especially that forceps should never be used on the aftercoming head. With this opinion the reviewer takes strong exception as he does also with the statement that no attempt should be made to deliver an arm anteriorly in breech extractions. In some cases it is easier to deliver the anterior than the posterior arm. Baker¹⁶⁵ believes that the two main causes of intracranial hemorrhage are intense venous congestion caused by acute anaerobiosis and stress of delivery. In the author's series, hemorrhage occurred more frequently in fullterm and postmature than in premature fetuses. This is in marked contrast to the experience of many others. Sharpe and MacLair¹⁶⁶ found bloody and blood-tinged cerebrospinal fluid in 9 per cent of 500 newborn babes. Firstborn full-term males having difficult or prolonged labor, where forceps are used as a last resort rather than early, are more liable to this complication. Others in this group were delivered by midforceps or breech extraction. Dicks¹⁶⁷ believes that trauma and not hemorrhagic diseases is the most important factor in intracranial hemorrhage and he agrees with Sharpe and MacLair that lumbar puncture is most valuable. Wilcox and Caffey¹⁶⁸ report 2 cases where lead nipple shields used for a long time by nursing mothers were the source of lead poisoning in infants.

THE PLACENTA

During the last few years milk has been injected into the umbilical vein to determine the intactness of the placenta. Franken¹⁶⁹ advocates the use of air for the same purpose. Vaux and Belk¹⁷⁰ studied the umbilical cord and found that very few cords were alike. McCord¹⁷¹ found syphilitic placentas in 40.6 per cent of positive Wassermann cases. Siddall and Hartman¹⁷² classify infarcts of the placenta into four groups, all of which consist of degenerated villi and elements from the maternal blood. They found infarcts in 67.7 per cent of 700 placentas. Siddall¹⁷³ also found six small angiofibromata of the chorion in 600 placentas. J. W. Williams¹⁷⁴ discusses the placentation of one quadruplet and six triplet pregnancies.

MISCELLANEOUS

According to DeLee¹⁷⁵ the five most common errors in obstetric practice are, viz.: (1) failure to make a complete diagnosis, (2) lack of knowledge of, or failure to practice the real principles of asepsis, (3) ignorance of the course of occiput posterior positions, (4) operating

before complete dilatation of the cervix is present, and (5) a disappreciation of the pathologic dignity of the art of obstetrics which leads to downright neglect of the woman in labor. Among 4,488 cases in an outdoor clinic, the obstetric mortality was 0.27 per cent which, according to Bailey,¹⁷⁶ is 50 per cent below the figures for New York State. The stillbirth mortality was 3.5 per cent and the neonatal mortality 1.7 per cent. The summation was over 30 per cent lower than the figures for New York State. These good results are due to the early transfer of the major operative cases to suitable hospitals and to aseptic technic. Rosensohn¹⁷⁷ analyzed the obstetric mortality at the New York Lying-in Hospital for 1924 and found the gross maternal death rate to be 0.4 per cent, the stillbirth rate 4.1 per cent and the infant death rate 2.8 per cent. The maternal mortality for cesarean section was 4.7 per cent, for podalic version 3 per cent and for eclampsia 23 per cent. Coffin, De Kruif, Southard and Hamblen¹⁷⁸ studied the maternal mortality figures of Massachusetts for the years 1922 and 1923. They found that septicemia, toxemia and hemorrhage were responsible for 58 per cent of the deaths, and in 591 of this series of 984 cases, operative procedures had been undertaken. Lack of adequate prenatal care was evident in 89 per cent. H. A. Miller¹⁷⁹ made 1,000 examinations of women as soon as possible after their children were six weeks old and found that postpuerperal morbidity occurs much more frequently than is generally supposed. Operative deliveries and fever during the puerperium increase this morbidity. C. J. Miller¹⁸⁰ discusses the preventive aspects of postpartal care and particularly emphasizes cervical lacerations, retroflexion of the uterus, abdominal support and the follow-up of patients who have had toxemia.

Of 1,000 women under the observation of Danforth and Galloway,¹⁸¹ 18.8 per cent had retrodisplacement of the uterus during pregnancy or the puerperium. Only 5 out of 55 women who had retrodisplacement during pregnancy, complained of symptoms. Of the women who had retroplaced uteri on the 12th day after labor, 40 per cent were relieved by the knee-chest position.

Lee¹⁸² discusses the teaching and practice of obstetrics basing his opinion on an analysis of cases at the Cook County Hospital where the policy is decidedly conservative. Welz¹⁸³ gives a very stimulating report on the prenatal work in Detroit and shows the numerous benefits derived from this work. Such a paper will go a long way in convincing not only physicians but also lay individuals of the great value of prenatal care. Adair¹⁸⁴ outlines the physician's part in a practical state program of prenatal care, and Mosher, Kosmak and Schwartz¹⁸⁵ publish the report of the Joint Committee on Maternal Welfare. The plea of the committee is that less time be devoted to those branches in the medical curriculum which are more or less cultural and that more hours be given to obstetrics which does not now have the attention it should have. The Committee has also issued an outline of "Standards of Prenatal Care"¹⁸⁶ for the use of physicians. Rowland¹⁸⁷ does not believe that the best results in the reduction of mortality and morbidity in childbirth are going to be obtained through the further education of physicians and social service nurses but through efforts to bring certain facts directly to the laity, and he mentions nine particular suggestions for this propaganda.

DeLee¹⁸⁸ describes in detail his ideas concerning the maternity ward

of a general hospital. He emphasizes that a proper modern maternity should have (1) wards and rooms for clean puerperae, (2) nurseries for clean babies, (3) a receiving room near the entrance for the distribution of cases and the separation of infected ones, (4) observation rooms for suspect mothers, (5) observation nurseries with cubicles for suspect babies, (6) a disconnected isolation pavilion, provided with (a) individual suites (room, bath, toilet, lavatory and sterilizer), (b) clean nursery for the babies of infected mothers, and (c) private rooms or large nursery with individual cubicles for infected babies.

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Selected Abstracts

Miscellaneous

Schmidt, H. R.: The Secretion and Absorption of the Liquor Amnii and Its Disturbance in the Presence of Monstrosities. Monatschrift für Geburtshilfe und Gynäkologie, 1926, lxxii, 1.

Anatomic studies have shown that the liquor amnii is a special secretion of the amniotic epithelium and it has been supposed to come chiefly from the epithelium of the placental portion of the amnion. The epithelium of the latter differs from the rest of the amnion for its cells are high and cylindrical and appear to have secretory activity. The amount of fluid which reaches the liquor amnii directly through the maternal blood is very small.

The epithelium in cases of polyhydramnios does not differ much from the epithelium of normal cases. Polyhydramnios may result not only from hypersecretion but also from lessened absorption. A great part of the absorption occurs in the alimentary tract of the fetus after the liquor has been swallowed. In many cases of polyhydramnios there existed an absence of such absorption, e.g., because of atresia of the upper intestinal tract. Such a case of polyhydramnios associated with a tracheoesophageal fistula is reported by the author. The opening between the two organs was barely large enough to permit water to pass. In this fetus the intestinal tract was entirely empty and was tightly contracted.

J. P. GREENHILL.

Küstner, H.: Does the Child Help Itself during Labor? Monatschrift für Geburtshilfe und Gynäkologie, 1925, lxxi, 14.

In ancient times the accepted belief was that when the fetus was mature it initiated and completed labor through its own activity. During the last century there was a reaction and no mention at all was made of the self-help of the fetus during labor. However, while we do not believe that the child braces itself against the uterus and delivers itself, we should not maintain that the child does not help at all. Sellheim is of the opinion that the child does help in its own delivery. This assistance consists in reflex attempts to accommodate itself to the birth canal during deliv-

ery according to the law of least resistance. Movement of the child may occasionally be seen in the interval between pains when the head remains in the vulva for a long time. The same condition may at times be felt on internal examination. There are essentially two types of movements of the child, stretching and rotation.

J. P. GREENHILL.

Jaroschka, K.: *The Course of the First Labor in Advanced Age.* Medizinische Klinik, 1926, xxii, 448.

Nearly all authors who have studied this question come to the conclusion that there is more danger to mother and child among older women than among younger ones. But age alone is not responsible for this. Other factors play a part, notably the constitution of the individual. Among aged primiparas there are two groups, namely, those who conceive late for extraneous causes and those who cannot become pregnant earlier for constitutional reasons. In the latter group the cause may be defective ovarian function or hypoplasia of the genitalia.

The author studied 711 primiparas over twenty-seven years of age and 1804 primiparas under that age. The incidence of contracted pelvis among the older women was 8.3 per cent, as compared with 5.2 per cent for the younger ones. This indicates a diminished body development in general, with special underdevelopment of the genitalia.

With increase in age there was an increase in the incidence of premature rupture of the membranes. Deficient uterine contractions occurred three times more often among the older women, and a hypoplastic cervix often gave trouble among the older women.

Among the women under twenty-seven years of age, spontaneous delivery occurred in 87 per cent as compared with 73.7 per cent for the older women. The duration of labor was not longer among the latter, but disturbances of the third stage occurred more often. More of the older women suffered lacerations, but eclampsia did not occur more often.

The children of the older women were as a rule heavier than the others. With increase in maternal age the incidence of operative delivery increased and also the fetal mortality. The bad prognosis of advanced age is due essentially to underdevelopment of the genitalia. The hypoplasia prevents early conception and after conception does take place it causes dystocia and increases the danger to mother and child. There are two distinct types of women with hypoplasia. One is adipose and the other is asthenic and gracile.

J. P. GREENHILL.

Mosher, George Clark: *The Method of Reducing the Maternity Death Rate in Missouri.* Journal of Missouri State Medical Association, 1925, xxii, 133.

Maternal mortality in the United States is exceeded only by that of Spain and Belgium in the sixteen civilized countries of the world. The latest report gives 16.30 per cent per 100,000 population, and of these deaths, 90 per cent are preventable, being due to sepsis, toxemia, and hemorrhage.

The best methods of reducing the mortality are: (1) Prenatal care in the fullest sense. (2) Aseptic care of the patient in labor; (a) Use of rectal examination, with avoidance of vaginal examination, (b) Sterile field, (c) Catheterization when necessary, (d) Boiled instruments, sterile gloves, etc. (3) Watchful waiting in labor. Consultation with specialist in unusual cases. (4) Cesarean section, when done under conditions which are favorable, has its place. (5) Pituitrin may be tolerated in multiparae with stasis and the head on the perineum. It is never safe in primiparae or in cases of dystocia.

ADAIR AND CARLSON.

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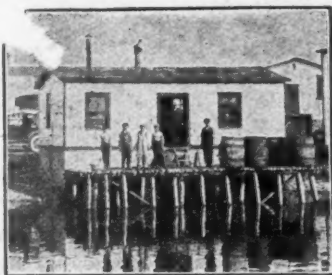
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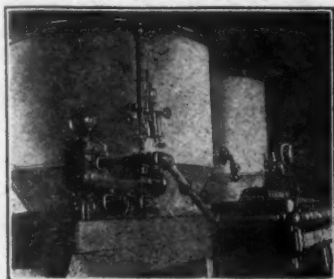
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